AN EXAMINATION OF
STUDY HABITS AND LEARNING STRATEGIES
IN POLYTECHNIC STUDENTS

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DECLARATION

Whilst being registered as a candidate for the degree of PhD, for which submission is made, the author has not been a registered candidate or enrolled student for any other award of the CNAA or other academic or professional institution during the research programme.

The material in this thesis has not been used in any other submission for an academic award.

Eira Williams

Eira Williams, May, I985

"I like work; it fascinates me.
I can sit and look at it for hours.

The idea of getting rid of it
Nearly breaks my heart."
(Jerome K. Jerome)

"They know enough who know how to learn."
(Henry Adams)

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ABSTRACT : *AN EXAMINATION OF STUDY HABITS AND LEARNING STRATEGIES IN POLYTECHNIC STUDENTS.*

Eira Williams, The Polytechnic of Wales,
CNAA PhD dissertation, May, 1985.

The Study considers four generic classes of variables to be important in describing students' learning. These are identified as (I) cognitive, (2) dispositional, (c) behavioural, and, (d) contextual.

The sample comprises 620 polytechnic, first year students, of different faculties and pursuing degree and non degree courses. Standardised tests of intelligence, personality and study habits are used to measure individual difference variables, and a sub sample of I20 are given a learning strategies test. Additionally, a cross faculty sample of I50 students provides data on students' attributions of academic achievement.

The Study examines the inter-relationships existing between the classes of variables identified, and specifically focuses on those relationships occurring for study habits and for learning strategies. The relationship of variables with examination performance is observed within faculties.

Results suggest that variability in study habits exists between groups of students classified according to sex, type of course pursued and faculty membership. It is suggested that study habits are associated with certain individual difference variables and with the dependent variable of examination performance, within faculties. A consistency in students' study habits is observed to exist over a period of one academic year which implies stability.

Results also suggest that learning strategies, defined as *focusing* and *scanning*, are discriminably distinct and constitute a description of students' preferred learning approach. The Study examines the relationship between learning strategies and other individual differences.

The results of the Study are suggested to have some implications for practice, in terms of counselling and remedial intervention programmes, and for the generation of further research into the relationships of the variables identified, with each other, and with academic success and failure.

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CHAPTER ONE : THE SELECTION OF THE RESEARCH FOCUS

"There's lots of ways of doing things,
as everyone supposes, for some turn
up their sleeves at work and some turn
up their noses."

(Traditional nursery rhymne)

I.I THE CONTEXT

The potential educational significance of obtaining valid estimates of students' study habits and learning strategies seems great. The fact that some students do less well academically than others, despite having superior intelligence, suggests that academic success and failure cannot be attributed exclusively to ability factors (Kelsall, I963).

Biggs (I979, p.398) describes how students vary in their, *"predilection for studying and motives for being at university"*, and suggests that, *"In the interests of fairness the tertiary educator needs to take these into account"*.

A study of students' academic behaviours has two practical consequences. Firstly, in human terms there is the possibility of using information about why students succeed or fail to reduce the individual distress of those who become wastage statistics through examination failure. This is an applied use of research in guidance and counselling and implementation of remedial programmes in preventative and improvement courses of action.

Secondly, in organisational terms there is the contribution of information about students' success or failure to institutional efficiency in that an early diagnosis of potential learning difficulties might lead to higher pass rate percentages.

Wastage rates through failure and drop out is reported to be a cause for concern in British universities and polytechnics. A Report published by the University Grants Committee, 1968, called, *An Enquiry Into Students' Progress*, stresses this concern.

The Report presents data on those students who might have been expected to graduate during the years 1965 and 1966 but who failed to do so. The incidence of failure seems to bear some relationship with the type of courses pursued with, for example, failure rates ranging from nine per cent in Social Sciences Faculties to twenty one per cent in Engineering Faculties.

Contemporary studies of failure rates in British universities and polytechnics support this finding. Studies include those done at Keele; Liverpool; Sheffield; University College London; Queens College, Belfast and the London School of Economics, which are reviewed by Kelsall (1963).

The failure rates disclosed by these supportive studies vary between faculties within the range of twelve to twenty five per cent. An estimation made by Malleston (1967), based on the continuance of the wastage rates reported, suggests a failure statistic of twenty thousand students in British universities and polytechnics for every year in the early 1980's.

Kelsall (1963) suggests, in a critical appraisal of the British evidence on university student selection, that it should not be an *a priori* assumption that increased efficiency in selection for university and polytechnic places is desirable. He identifies the inherent dangers of a more efficient procedure as being twofold.

Firstly, there is the probable *creaming off* effect of brighter students applying to those institutions with high reputations as first choice institutions. Those universities and polytechnics ranked low in the preference order would potentially recruit from rejected candidates. Heap (1985), in an analysis of universities and polytechnics offering high grades for places, describes the current popularity rank order of institutions. The universities of Bristol, Nottingham, Bath, Birmingham, Manchester, Durham, Southampton, East Anglia, Warwick, Leeds and York are described as the eleven most popular after Oxford and Cambridge. The most popular polytechnics are described as Brighton, Bristol, Manchester, Middlesex, Nottingham (Trent), Oxford, Portsmouth and Sheffield (1985, 29th April, *The Daily Telegraph*)

An implication of the creaming off effect is a reduced consistency in standards across institutions and an undersubscription to certain ones which could mean lower entry requirements to meet target recruitment figures, or a failure to recruit at all.

Secondly, there is a probable effect on sixth form work which might result from refined selection procedures. A limitation on syllabus followed might be one consequence of schools' coaching policy.

However, the argument for a positive effect on bringing about higher pass rate percentages and on the reduction of personal distress exists.

A problem with the empirical data is that there is no commonly agreed criterion for what counts as an efficient selection choice. The most usual understanding of the criterion is that efficiency is evaluated by measuring students' learning achievement expressed as degree classification or passing and failing in non degree courses.

There are reasons to believe that efficiency, defined in these terms, is not high and that examination results might have little or no significant relationship with assessed potential at entry.

Some investigative studies support this proposition. Johnson (I954) examined the history of applicants for a pre-clinical course at University College, London during the years I947-54. He found that selection decisions made prior to entry by admissions tutors had very little bearing on students' subsequent academic performance.

Furneaux (I962) describes a comparison made of the subsequent academic performance of students accepted onto degree courses at Sheffield University in I949 with those students rejected by Sheffield but accepted elsewhere. He establishes that no significant differences existed between the degree classifications obtained by both groups of students.

Himmelweit (I963) compares the selection techniques used at the London School of Economics in the Late I940's and finds that none of them had good prognostic value when used to predict later achievement.

Emerging from the empirical work is a suggestion that formal selection procedures, as used in the institutions referred to, have little predictive validity. One interpretation of this is to question the usefulness of the particular tests used for selection. Alternatively, it can be interpreted that selection tests, in general, have little forecasting potential.

A practical consequence of the first interpretation is to search for alternative individual difference correlates of achievement to those identified as being of importance in the studies quoted. This might lead to a de-emphasis on ability factors, for example, if these are seen to be the traditionally preferred ones.

A consequence of the second interpretation is the conclusion that selection procedures in general have a limited usefulness and that a policy of recruitment on basic entry requirements is sufficient.

Malleson's (1967) study of selection techniques used in British universities during the years 1948-1951 supports this proposition. He suggests that :

"However sophisticated ones techniques, it is hard to believe that selection prior to entry could tell departments much more than they learn from a year's experience of having the student in college ... at the best, only a proportion of first year students failing would be likely to have been avoided by better selection."

Translated into policy this would accept a student wastage and tolerate student distress through failure.

A third alternative is to propose new criteria of learning against which selection techniques are evaluated. This involves a redefinition of what counts as academic success and an abandonment of examination performance as the criterion.

Such a redefinition is problematic. Institutions are increasingly made aware of the need for accountability which implies a requirement for criterion referenced assessment procedures. In this way graduates' qualifications have interpretive and communicable value. Alternative criteria would not be as precise nor as commonly understood.

It seems reasonable to suggest that the first of these alternatives is the most predictable reason for some studies finding low correlations between selection procedures and subsequent success. In other words, there is a need to redefine the selection techniques recognised as having predictive value in forecasting students' examination performance. The implication is that many individual difference characteristics of students, measured during selection processes, need recognition and careful description.

Research studies investigating the efficiency of selection techniques have tended to use instruments which are psychometric and which have established reliability, but which are mainly of one kind. That is, they tend to be maximum performance tests like measured intelligence, scholastic aptitude or A level performance.

It is perhaps the case that these ability factors are not the major determinants of academic achievement and that early studies have failed to find significant relationships between selection data and degree classifications because of the limited focus on ability measurements only.

The traditionally held view that intelligence quotient or A levels are best predictors of academic achievement in higher education may be challenged by empirical research results concerning the effects of other individual difference characteristics on learning outcomes. A suggestion of this present Study is that student success and student failure are multicausal phenomena.

The University Grants Committee Report of I968, for example, suggests that identifiable differences between students who successfully complete their courses and those who do not, exist and that there is evidence to think that they are other than ability differences.

The Report's (I968) suggestion is based on the observation that student wastage during the first year appears to be the result of different causes and that these causes relate to the time of year when wastage occurs. For example, wastage due to voluntary withdrawal tends to occur in the first term and to be the result of non academic problems like homesickness or personal adjustment difficulties. Wastage occuring in subsequent terms does appear to be course related and so explained in terms of academic problems. This wastage is either voluntary withdrawal or involuntary through failure.

An implication is that low achievement and failure cannot be attributed to lack of ability alone. Other factors associated with failure might be personality variables which predispose students' difficulties in adjusting to the demands made by academic tasks or they might be external factors such as financial constraints and domestic problems.

An organisational implication of this is that there is probably not a great deal of counselling potential in the first term of students' first year when withdrawal seems mainly due to domestic and other non academic problems. Counselling in terms two and three, however, would be potentially useful.

A research implication is that investigative studies need to focus on a wider range of variables associated with learning performance and that these variables need to be defined in terms which are less exclusively cognitive.

I.2 THE FORMULATION OF THE RESEARCH PROBLEM

Individual difference variables of academically successful students have been examined in both British and American studies with a characteristic lack of agreement about which variables are important. A consensus reached by the studies is that learning achievement is a complex area of research with many factors being involved.

British studies (Dale, 1954; Hopkins, Malleson and Sarnoff, 1956; Wankowski, 1973; Dunkin, 1978) typically emphasise the effects of low motivation and weak academic interest as important variables. American studies (summarised in Lavin, 1965) emphasise the effects of ability, expressed as measured intelligence or scholastic aptitude, on learning achievement.

Some British studies adopt the latter focus which is more characteristically American in the emphasis on ability factors. They do not always confirm the American results that indicate correlations between ability predictors and academic success. The British results tend to suggest that ability varies in its forecasting potential across different faculties and seems to have some dependence on subject content of different courses. An additional finding of one British study (Himmelweit, 1963) is that A levels, as an ability measure, are significantly related to subsequent success at university only when students are *borderline* in examinations.

Very few studies in either the British or the American Literature adopt an extended research model to focus on any inter-relationships existing between different independent learning variables. The British and the American research traditionally examines the effects of either ability or personality variables on examination performance but not the inter-relationships which might occur between these groups of variables (Cohen and Child, 1969).

Wilson (1968) has described the need to focus on these inter-relationships and he uses an analogy to illustrate the need. He describes how both the *going* and the *form* of contenders in the Grand National needs studying in order to make predictions about survivors in the *field*.

The analogy acknowledges the importance of contenders' experiences encountered when running a course to finishing it successfully. It is not simply the starting form of a student that determines performance in an academic field, it is also the environment of the course on which he proceeds and the ways in which a student adapts to it.

One form of adaptation students must make at universities and polytechnics is towards requirements of studying. School is a relatively structured environment compared with institutions within Higher Education which require adjustments to new ways of learning.

A suggestion is that the study habits and the learning strategies of students, if identifiably distinct and measurable, could count as individual difference correlates of academic performance. It additionally suggests the usefulness of examining what patterning exists between these and the traditionally valued variables of success.

An indication of some early research interest in describing this patterning of variables is found in the work of Lavin (I965). He suggests that the ways in which students organise and carry out their studying determines the effectiveness of their ability.

This confirms an observation (Brown Holtzman, I967) from the same period of research activity that certain university students with high levels of measured intelligence have study habits different from those with lower measured ability ability but similar academic attainment.

Lavin (I965) recommended that an evaluation of traditionally emphasised predictors of achievement be made to establish a more precise interpretation of their relationship with critera like examination results. He specifically warns against assuming that ability measures and achievement levels have a linear relationship and he suggests that ability has a more probable *threshold effect.*

An implication of the Lavin (I965) recommendations is that variability between student performances in examinations needs to be attributed to factors other than measured intelligence or A levels.

Examples of alternative factors investigated include the work by Svensson (I977) into learning approaches; Eysenck and Cookson (I969) into personality traits; Miller and Parlett (I974) into perception of learning requirements; Laurillard (I979) into contextual effects.

Included in these examples are both cognitive and situational factors. These situational factors which describe the effects of the learning context on achievement are represented by Laurillard (1979) whose unpublished thesis describes how course membership affects students' performance through an inspiration of expectations and requirements which are not uniform in all courses. Hudson (1966) had earlier suggested how faculty membership generates a learning *milieu* that affects students' styles of thinking. In a retrospective account of undergraduate life at Harvard University, Bruner (1983) makes an extremely similar point about the effects of the learning milieu.

Additionally, there are studies (Wankowski, 1979; Harri-Augstein, 1979) suggesting that the ways in which students work as undergraduates have direct consequences on their achievement levels. These ways of working are described as *study habits* and they are identified as being measurably different in kind and in efficiency. This qualitative difference between study habits contrasts with a quantitative distinction made between students' working behaviours in earlier studies. These (Williamson, 1935; Hopkins et al, 1958; Holloway, 1966; Cooper and Foy, 1969) have tended to describe study behaviours in terms of number of hours spent studying.

The studies referred to in total suggest a relevance of different variables in accounting for academic achievement and in descriptions of students' learning processes. It is possible to locate within these various variables a classification of four generic classes of things. These are suggested by this present Study to be the following four categories :

a. *cognitive variables*

b. *dispositional variables*

c. *behavioural variables*

d. *contextual variables*

The focus of the present Study is on the relationships, if any, existing between the behavioural variables described as what students do when studying, and the cognitive and dispositional variables that constitute individual characteristics of learners. These relationships are investigated within the context of faculty and course membership.

The formulation of the research problem arises out of a dissatisfaction with the traditionally held view regarding the supremacy of ability factors in forecasting academic success. It seems reasonable to suggest that learning potential interacts with actual experiences of learning in a matrix of variables.

This is a perception of *studentship* as analagous to *apprenticeship* during which the acquisition or modification of necessary *tools* needed for the *academic trade* becomes critical to academic competence.

I.3 THE ACADEMIC FIELD OF THE STUDY

The academic field of the Study is that of educational psychology. As an academic field, educational psychology has a history of concern about its content boundaries and its methodological status.

Unlike other fields, educational psychology is identified with two subjects which are themselves distinct. These are education and psychology. The problem of identity is added to by the use of content from other subjects like sociology of education and like biological bases of psychology.

The issue of content boundaries for educational psychology makes definitions of it difficult and gives rise to what Treffinger (1977, p. 26) calls, *a lack of conceptual ownership*. It is unlike most other academic subjects, as for example the natural and physical sciences which are able to define a precise content boundary because they create and apply their research. Research is considered to be *basic* not *applied* because it is generated from within its own subject area. When this content is used in the context of the engineering sciences this neat boundary is eroded.

Educational psychology lacks what these kinds of subjects have in terms of conceptual clarity. It depends on research data derived from studies by other specialists and is enough of an engineering science to be thought of as applied in its scope.

The historical origins of these problems is seen in an article by Hall-Quest (I9I5, p. 602) in which it is written :

"To call educational psychology a distinct discipline or science is looked upon by some as arrogant presumption ... But the fact education forms one of the many fields of specific application psychological truth ... is reason enough to emphasise educational psychology as worthy of a distinct title ... Educational psychology is distinct from general psychology, biology, history and philosophy but it uses data from all these departments of learning and in addition seeks to demonstrate in mathematical terms of graphs the results of investigations."

This early statement concerning the content and methodology of educational psychology has some contemporary relevance. It is still considered by some (Yee, I970) to be presumptious in its scientific aspirations. Critics see the failure of achieving an elevated status in the hierarchy of the behavioural sciences as due to a lack of concord between content and method.

Seagoe (I960, pp. 407-9), in a survey of the field for an edition of the *Encyclopedia of Educational Research*, provides a later view of the methodology needed and the applied scope of it :

"(It is) concerned with the human factor in learning. It is a field in which concepts derived from experimental work in psychological laboratories are applied to education, but it is also a field in which experimentation is carried out to test the applicability of such concepts to education and to round out the study of topics of interest to teachers."

Professional groups have been interested in the dilemma of content and methods for educational psychology. Some years before Seagoe's

(I960) work, the Division I5 of the American Psychological Association and the National Society of Colleges of Education appointed committees in I946 to investigate the activities of educational psychology researchers.

Reports published by the two Committees agreed in their definition of educational psychology being essentially concerned with the application to education of theories derived from research into such things as, *learning; personality; measurement and evaluation* (Travers, I969, pp. 4I3-9).

A later Division I5 Committee published a handbook called, *A Handbook For Instructors of Educational Psychology* (I965), which suggests the *proper content* of educational psychology to be so diffusely recognised as to make a descriptive summary impossible.

No further synoptic reviews by professional bodies have been published but an additional source of reference for an historical search into the conceptual identity of educational psychology is the appraisal of textbooks published in the academic field. Some reviews of early published textbooks have been done, including that of Hendrickson and Blair (I950) which documents the years of publication between I940 and I946, and the more contemporary review of Yee (I970).

Yee's (I970) review was commissioned by a symposium on *The Crisis of Content In Educational Psychology* and it is a review emphasising diversity and range in textbook content. He writes (1970, p. 5) :

"There are many spokesmen and little agreement about what content is most relevant for the area. Support for this explanation increases when one examines the selections and sees the wide range of theoretical and methodological content."

This range of methodological and theoretical content to which he refers relates to questions of research design. The issue of basic or applied research within psychology generally is arguably a spurious one as long as the research is well done but there are implications of both for the way investigations are done.

These implications concern the ways in which problems are examined. If the boundaries of educational psychology are thought of in much the same way as those of engineering sciences, the basic research would be done within sub fields of the behavioural sciences and educational psychology would be confined to decision making processes about the best ways in which to apply the findings.

Alternatively, if educational psychology is thought of as being concerned with initiating research investigations into problems of classroom learning, basic science research becomes a prerogative of it. An implication is that educational psychology is then perceived as an independent science.

The historical origins of decisions about the appropriateness of research designs for educational psychology can be seen in a publication by James Sulley, Examiner for the moral sciences at Cambridge, called, *Outlines Of Psychology With Special Reference To The Study Of Education* (I884).

In Appendix A Sulley discusses two *methods of psychology* which he calls *introspection* and *observation*. He describes the appropriateness of both for investigation but comments on the objectivity of observational method. It was not until some time later that more empirically valid techniques were introduced.

These empirical techniques are those of experimental science and they were first used within the academic field of educational psychology in the nineteenth century. Boring (I929) describes how the new emphasis required careful formulation of the problem and an examination of theoretical considerations to arrive at hypothetical solutions. This, he identifies, is a *new* educational psychology.

An implication for future trends was a superimposition of new research design approximating to that used in the natural sciences. The new insistence on carefully controlled experiments aimed at establishing empirical evidence is seen in the textbooks of that and later periods. Thorndike published the first text on educational psychology from which Watson (I96I, p. 222) quotes :

"This book attempts to apply to a number of educational problems the methods of exact science. I have therefore paid no attention to speculative opinions and very little to the conclusions of

students who present data in so rough and incomplete a form that accurate quantitative treatment is impossible."

Thorndike published three volumes containing experimental studies and in them defines a broad parameter for content within educational psychology as well as suggesting its methodological emphasis. The tradition established by Thorndike continued for a long time and it was Wittrock (I967, p. I7) who proposed what was a new trend for the development of educational psychology. He writes :

"It is time for us to practice a liberal conceptualisation of educational psychology as the scientific study of human behaviours in educational settings. As scientists we should attempt to describe, understand, predict and control behaviour in education."

This reference to a liberal conceptualisation of educational psychology is something about which Bruner (I966, pp. 70-2) hints when he writes :

"Something happened to educational psychology a few decades ago ... Part of its failure as educational psychology is the failure to grasp the full scope of its mission. It has too readily assumed that its central task was the application of personality theory or of group dynamics or whatnot."

Bruner (I966) thinks that application of research is an important issue but that educational psychology should be applying theory which has been tested in its own field. Haggard (I954, pp. 539-43) supports this when he says that educational psychology ought develop the methods, concepts and research programmes needed to establish its own content base.

The trend is towards a concept of educational psychology as an independent discipline with its unique structure of knowledge developed out of a programme of research carried out in educational settings and applied to similar contexts. Ausubel et al (1978) represents contemporary support for this when they define educational psychology in the following way :

"That special branch of psychology concerned with the nature, outcomes and evaluations of school learning and retention."

It is argued by Ausubel et al (1978) that educational psychology is concerned with examining learning of a specific kind and that only research into classroom learning can be relevant to understanding it. Ausubel continues :

"My position is that the principles governing the nature and conditions of school learning can be discovered only through an applied or engineering type of research that actually takes into account both the kinds of learning that occur in the classroom as well as salient characteristics of the learner."

Ausubel (1978) rejects what he considers to be alternative research approaches in preference for that directed towards the investigation of problems in context. The first alternative is a *basic science* research concerned with the definition of general principles and aimed at advancing knowledge rather than providing a theoretical base for practice. He writes (1978, p. 235) as follows :

"Since the research design is not oriented to the solution of these problems this applicability is apt to be indirect."

The second alternative approach is to use an *extrapolated* research method. This is applied because it can be used prescriptively to suggest practice and to solve problems but it is open to criticism on the grounds that it overlooks the complexity of problems and makes invalid extrapolations from laboratory subjects.

Ausubel et al (I978, p. 237) describes appropriate research as allowing data to be *particularised at an applied level of operation.* There is a methodological debt to basic science but it is research done in the educational contexts to which the findings are applied.

Becker (I952) supports this trend in educational psychology research but warns against too heavy an emphasis on what he calls the *scientific respectability of basic science research.* This, he feels, has sometimes caused an over concern with purity of method and an under emphasis on the understanding of learning/teaching interactions. His is a plea for theoretical rationales behind classroom practices that are empirically based but that are of use.

This is the academic field of the present Study. It is set within the context of educational psychology which is perceived as a field of academic study concerned with understanding learning in classrooms. The search for this understanding is done empirically and the intention is that it will generate information for use in this and similar contexts.

I.4 THE STUDY

The rationale for this Study is that there are identifiable differences between the ways in which students study and that these differences might be associated with biographical data like sex, previous academic experiences and with personality and ability variables.

Additionally, it is thought that there might be external variables affecting both the methods of studying which students use and the expectations about requirements of study behaviours which students acquire. These variables have, in the Literature, been referred to as faculty or departmental membership, type of course pursued and methods of teaching and examining (Biggs, I970; Goldman, I973; Entwistle and Ramsden, I983).

An example is the evidence available which suggests that assessment techniques like objective testing develop particular study skills which are different in kind from those required by essay answers (Biggs and Braun, I972). Some studies have suggested that the ways in which Examination Boards combine marks to arrive at degree classifications can affect students' approaches to studying when those students are aware of marking procedures (Entwistle, I983).

Students' perceived need to match study habits to course requirements might be another source of difference between individuals which relates directly to academic achievement. Biggs (I978, p. 266) has suggested the following :

"Academic success is not achieved by any one particular strategy. Good students work in diverse but characteristic ways."

Intended here is the proposition that students who perceive the variability in requirements made on them by different courses or lecturers will respond with a flexibility in their use of study habits. Miller and Parlett (I974) have examined the effect this has on examination performance, in terms of a particular study habit, in a group of undergraduates at Edinburgh University.

The present Study assumes that the type of learning tasks required of students, although distinct in their academic demands regarding the acquisition of subject content, are of a conceptual nature. This might itself affect the relevancy of certain ways of studying and thinking.

Kohler (I927) once wrote that, *the complexity of a task correlates negatively with the probability of solution*, suggesting that the level of difficulty as well as the type of task affects achievement. If the nature and the complexity of a task affects thinking processes, then some tasks will require discriminably different learning approaches than others.

The present Study adopts a conceptual model of learning in which the *interface* of the conceptual structures of knowledge and the individual differences of students are examined. A theoretical model of research based on this is described by Klausmeier, Ghatala and Frayer (I974). They suggest that the ability to learn depends on existing relevant concepts as well as a suitability of external conditions. These external conditions are identified as the task and the context.

The research and pedagogical implications of this model are realised in the curriculum model of Johnson (I972). Johnson distinguishes between cognitive objectives established by a subject task and the pre-existing cognitive structures that constitute the learner's existing knowledge of things.

Johnson (I972) sees curriculum development being concerned with the translation into practice in teaching of the match between concept structure, cognitive structures and methods of instruction. It is a prescriptive and descriptive model in which classroom learning is perceived as having an inherent structure, the constituent parts of which define the concepts.

Ausubel (I963) has said that this kind of learning is *meaningful learning*. Potential meaning converts to actual meaning when assimilated by a learner through accommodations of what is already known to the new information. The conversion can occur only when the inherent structure of the information is compatible with the learner's present state of knowledge.

A focus taken by the present Study is the examination of how some students approach the learning of concepts. The concept tasks used in the Study are experimental because they need to be equally unfamiliar to all students in the sample population. Any discriminable differences in approaches to concept identification in the same concept task may be suggestive of variability in styles of thinking which students have.

Another focus of the Study is the examination of the relationships, if any, existing between this individual difference and those identified as ability, personality and study behaviours of students within a polytechnic context.

It is a Study wholistically concerned with an area of research interest that Cronbach (1964) once referred to as a *concomitant influence of factors on academic achievement*. The Study examines the relationships between, and the effects of, those factors of learning which are generically called cognitive, dispositional, behavioural and contextual variables of learning.

CHAPTER TWO : AN EXAMINATION OF KEY CONCEPTS AND TERMS RELEVANT TO THE STUDY

"There's glory for you."
"I don't know what you mean by glory", Alice said. "I mean, there's a nice knock down argument for you."

"But glory doesn't mean a nice knock down argument", Alice objected.

"When I use a word", Humpty Dumpty said in a rather scornful tone, "it means just what I chose it to mean; neither more nor less."

(Lewis Carroll, Alice In Wonderland)

Idiosyncratic use of words falls foul of the Humpty Dumpty criticism. The Literature on Study Habits and on Learning Strategies is inconsistent in its definitions of terms, giving rise to a Humpty Dumpty effect on word usage.

This Chapter describes what is intended when reference is made to the terms *study habits* and *learning strategies*. It further describes what is meant by the terms *learning* and the measurement of learning as *achievement* criterion.

2.I STUDY HABITS

i. Definition

"They know enough
Who know how to learn."
(Henry Adams)

Study habits have been described as *tools of the academic trade* (Wankowski, 1979). Unlike the tools on non academic trades there is rarely advice about, or instruction in, how to select and use them.

Few students have any conscious realisation about what habits they have or the possibility of alternatives. There is seldom any consideration of the appropriateness of particular habits for studying and so for many students, reading, listening, evaluating and thinking become established ways of behaving that are fixed and that make students what Harri-Augstein (1979) calls, *prisoners of their own rigid competencies.*

Successfully submitting to being taught is often an alternative to bringing into conscious review the ways in which meaning is attributed to the information in lectures and texts. As Bruner (1960) observes :

"The difficulty of bringing into conscious review the strategies and techniques used in assimilating material cannot mean that such strategies and techniques do not exist."

The Research Literature refers to study habits as terminology labelling the methods of studying used by students for learning from texts, in lectures, when abstracting information from journals, and the preparation of and answers to examination question papers (Wankowski, 1979; Thomas, 1971).

The use of terminology varies between research reports with some using a small number of behaviours to describe students' study habits and others using more; and with some reports identifying certain habits in preference to others.

Sometimes too, the term *study skills* is preferred but it does not appear to be the case that this alternative terminology defines a different focus for investigation. *Skills* are seen as *habitual* ways of studying and in this sense the terms are used synonymously. In other words, skills are preferred ways of study and they become habits.

Insight into the lack of consensus about which habits are identified as being of most importance comes from an appraisal of the student self help guides to effective study which are currently available. Many of these student guides identify *good habits* as efficiency in lecture note taking, effective textbook reading, efficient revision for examinations and examination techniques (Maddox, 1967; Parsons, 1976; James, 1967; Rowntree, 1976; Buzan, 1974; Burnett, 1979; Cassie and Constantine, 1977).

Some of these guides describe certain habits as being most important in affecting academic success. Additionally, certain guides consider particular habits to be so important that they are exclusively about improvement in them (Erasmus, 1978). The guides with a wider acceptance of importance in suggesting an emphasis to particular habits tend to stress good lecture notes and the use of past papers in examination revision as being crucial (Cassie and Constantine, 1977).

Although there is a vague consensus about a hierarchical importance of certain habits over others it is not a universally agreed thing. Consequently, research investigations into the relationships existing between study habit scores on inventories and subsequent examination performance as an index of academic achievement have not yielded uniform results. This makes a comparative evaluation of results inappropriate because it would be methodologically invalid.

The ways in which study habits have been measured, and the importance attributed to them, in previous research is examined next.

ii. Measurement

> *"Plenty to do and plenty to get, I suppose", said Sgt. Buzfuz with jocularity.*
>
> *"Oh, quite enough to get, Sir, as the soldier said ven they ordered him three hundred and fifty lashes", replied Sam.*
>
> *"You must not tell us what the soldier, or any other man said, Sir", interposed the judge, "it is not evidence."*
>
> *(Charles Dickens, Pickwick Papers)*

Studies focusing on habits of reading, writing, revising and answering examinations, have tended to use one of two main types of study habit questionnaire. Occasionally original inventories have been used as well (Child, I978; Biggs, I978; Raygor, I970; Entwistle, I983).

The two most widely used questionnaires are the Wrenn Study Habits Inventory (I936; I94I) and the Brown Holtzman Survey of Study Habits and Attitudes (I953; I965). A new questionnaire, published by the Department of Education in New Zealand, called the Study Habits Evaluation and Instruction Kit (I979) is an inventory which has not yet been used in research in Britain or America.

The Wrenn Study Habits Inventory (I94I)

This is a weighted check list of specific habits and attitudes of study. It is self scoring and its stated objective (Manual, I94I, p.I) is as follows :

"To help the student understand the relationship of work habits to scholarship."

The Manual goes on to state on the same page that,

"the college or university should assume responsibility for giving students skilled assistance in remedying their habits or work once they have discovered which habits are faulty."

Content analysis of the Scale was done through a procedure of identifying those habits and attitudes of studying found in a significantly high number of students of both high and low academic achievement. These groups of students were previously matched for measured ability, sex and length of time at university. The I936 Scale used a student sample population at Stanford University but the I94I revision added a sample from the College of Science, Literature and the Arts, The University of Minnesota.

There are twenty eight items in the inventory grouped under general heading categories of reading and note taking, habits of concentration, ability to read between social events; general habits and attitudes towards work. Because it is a check list rather than a test, with items of known discreteness, it is not possible to establish reliability coefficients for it. Neither can it be claimed that it is a valid inventory because only one validation study was done and this was concerned with establishing concurrent validity accrued from test scores on related measures like grades and aptitude tests. For these reasons, it is disputable whether anything of value has been established by studies using the Wrenn as a measurement instrument.

The Brown Holtzman Survey of Study Habits and Attitudes (I965)

The SSHA was revised by the Psychological Corporation of New York in I965. It is intended for use in a self improvement role of improving study behaviours and it comprises a hundred item inventory with a rating scale to measure responses. Students indicate their responses to questions by using a five point scale to indicate their strength of agreement or disagreement with the stimulus questions.

Scores obtained on the SSHA are said to positively correlate with academic success in American college and university students. The Manual (I965, p. I) states that :

> *"In every instance thus far when the SSHA has been used to predict success in academic study, the correlations have been significant."*

Item analysis was done on large samples of students throughout colleges in America. Validation studies were done in which average grades in end of year examinations were established as the criterion of achievement against which the study habit scores were evaluated.

Not much use has been made in British research of the SSHA, either as a prognostic aid nor as a research instrument, and in the one Study where it was used (Gibbons and Savage, I965) no significant relationship was found to hold between test scores and examination performance in the student group. This contrasts with the American results where only one Study using the SSHA failed to establish significant relationships (Ahman, Smith and Glock, I958).

It might well be the case that the SSHA is more suitable for an American student population and that its applicability in British universities and polytechnics is limited, perhaps for reasons of cultural bias.

<u>The Study Habits Evaluation Instruction Kit</u> (I979)

The origins of the SHEIK are found in a survey done by the New Zealand Department of Education into the perceived need of teaching staff for a measurement technique of study habits in students.

The survey results indicated that an eighty two per cent majority favoured the development of an instrument like the SHEIK and so its construction began from a practical need. In its development the inventory used a population sample of I,500 students from colleges of sixth form students and it used content items ranging from place of study to examination techniques.

The inventory is standardised and has split half reliability coefficients and validity data calculated against the criterion of School Certificate Examination results.

Although the content of the SHEIK is described under *Test Materials Used In The Study* in later chapters, the assumptions underlying it are discussed below.

Assumptions underlying the SHEIK (Manual, p. 4) :

(a) Students who chose voluntarily to evaluate and remedy their study habits are most likely to benefit from SHEIK;

(b) Students should be involved in the evaluation and remediation of their study habits;

(c) Students who perceive that there is no 'best way' to study should still examine those study habits used characteristically by high achievers.

Comment and Implications for the present Study

The present Study prefers the SHEIK to the two former inventories for the following reasons. Firstly, it constitutes an original contribution to the already published work on students' study habits in being a new instrument. (The NFER has indicated some interest in its future use as a research tool (Letter dated 24th May, 1982, Appendix) and have, since the start of the present Study included it in their catalogue of tests (NFER-Nelson, 1984).

Secondly, the inventory is possibly more appropriate to British students than the American inventories. This possibility is based on the perception that the New Zealand educational system has a closer resemblance to the British system than does the American. The effect of this is to make the SHEIK standardised norms more appropriate than those of the SSHA or the Wrenn. A small implication of the present Study is the establishment of student norms in a British context.

Some evidence for the inappropriateness of the American scales for a British undergraduate population rests on the failure of American and British research results to agree on the validation status of the SSHA and the Wrenn as predictive measurements.

It is possible that *good study habits* as described by the SSHA profiles, for example, count for less in the British educational context. In other words, other factors are more important for achievement because of the situational differences and the suggested course work requirements.

The SHEIK is used in the present Study as a psychometric instrument to describe and measure study habits of students in the context of a polytechnic.

2.2 LEARNING

i. Definition

> *"To that small part of ignorance that we can classify and arrange we give the name knowledge."*

Learning in Higher Education is assumed by the present Study to be *meaningful*. The study habits and learning approaches used by students are skills and strategies used for the assimilation of concept.

A construct of learning is central to educational psychology. The trend within recent years has been towards definitions of learning which selectively describe classroom learning as discrete from other instances. This selective focus on a distinctive type of learning processes develops out of a perceived need to take into account the interactive nature of classroom learning which general laws of learning cannot accommodate.

The interactive feature of academic learning has been variously described in the Literature. The personal characteristics and the previous experiences of learners are not the sole independent variables. Some studies have considered the characteristics and teaching styles of lecturers; the task demands and the constraints of the learning context; the methods of evaluation and assessment used to identify instances of learning having occurred, have all independently been the focus for research enquiry.

Individual difference variables of students have been extensively examined with contemporary emphasis on the relationship existing between ability, personality and learning performance (Biggs, 1978; Roberts and Meier, 1978; Davis and Annis, 1978; Dunkin and Doenau, 1980).

Teaching styles have been examined in studies comparing the effects of formal and informal styles, sometimes called *progressive* and *nonprogressive* (Bennett et al, 1976; Satterly and Brimer, 1971; Satterly and Grey, 1976), on learning outcomes. The studies tend towards a de-emphasis on traditional concerns like teacher personality (Lewin, Lippett and White, 1943) to focus on what teachers actually do in their classrooms.

A new perspective for research developed from this new concern. In looking at what teachers do the type of interaction existing between teacher and taught led to Interactionist research describing the effects on learning of factors like teacher approval and expectations (Barker-Lunn, 1970; Morrison and McIntyre, 1969; Rosenthal and Jacobson, 1968; Nash, 1973; 1976; Delamont and Hamilton, 1976; Delamont, 1973).

An interactionist perspective perceives teaching to be a, *series of overt acts over a period of time* (Flanders, 1970, p. 10) with a research intention of understanding the role of teacher influence on student behaviours. Barr and Emans (1930) suggest how problems of measuring achievement become problematic in interactionist research because teacher competence cannot be seen as a discrete variable. Compare Rosenshine (I97I) who says :

"Since a teacher is engaged to teach or modify the behaviours of her pupils, the degree to which changes are produced in her pupils is a reflection of the ability of the teacher."

Dunkin and Biddle (I974) suggests further the importance of the teacher in contributing to learner performance and indicate that the effect is indirect and elusive to evaluation.

The present Study is centred around a combination of these ideas. The individual differences characteristics of learners are described as are the context of faculty membership and the type of course pursued in relationship to study behaviours, individual differences of personality traits and ability, and the preferred strategies of learning adopted by students in concept acquisition tasks.

The description of learning used in the Study is conceptual. A characteristic of conceptual learning is that it requires a distinctive kind of learning process during which the learner assimilates into existing knowledge what Ausubel (I963) calls *potential meaning*. Potential meaning converts to *actual meaning* when assimilation is successful. This is said to be completely idiosyncratic and dependent on the learner's pre-established concepts.

Potential meaning is also said to be inherent in the external world and susceptible to conversion within individual consciousness to a variable extent. Some students achieve meaningful learning more easily and more quickly than others because of their relevant past experiences and the extent of their present knowledge. The notion of matching *knowledge that is* to *that which is already known* (terminology of the present Study) is analogous to Bruner's (1966) proposition concerning an individual's frame of reference, the *internal model of reality* conferring meaning on experiences and learning in the external world. If there is a discrepancy between the two then nothing meaningful is acquired.

From a Behaviourist perspective, the basic assumption that meaning is referable to mental content and not to a behavioural disposition is *mentalistic* and so fallacious. Ausubel (1963) argues against apologising for the inference of differential states of consciousness He maintains that meaning implies some sort of representational equivilence between symbols and already acquired meaningful concepts in the learners' cognitive structures.

An implication of this is that the processes by which students acquire and retain and use knowledge will not become apparent until distinctions are made between the logical structures of knowledge and the cognitive schema of learners.

Schema is seen by Cognitive theorists as constituting pre-requisite internal conditions of new assimilations. It is a Piagetian term and it describes the organisation of schemes or ideas. The transition from existing to new ideas is achieved through a mechanism of equilibrium (Piaget himself prefers the term *equilibration* although few texts use it) which controls the transition from a level of conceptualisation to another.

The Piagetian description of learning is dependent on this concept of equilibration existing between individuals and their world. An occurrence of disequilibration produces a state of need and attempts to re-establish equilibration. The functionally invariant processes of this re-establishment are accommodation and assimilation.

Accommodation describes the changes or modifications made by the individual to what is already known in order to *assimilate* what is being found out. As a developmental progression the processes can be identified in the qualitative changes in childrens' thinking.

An example of this is the pre-school aged child's thinking about class concepts. The class *animal* is defined in terms of the perceptual features associated with a particular instance of the class known to the child. Accommodations need to be made in order to include new instances of the class unencountered before. In this way the class is expanded so that *animal* becomes an exclusive category for the class members identified as having certain attributes in common whilst varying in certain other respects.

Students, unlike pre-school children, have completed their concept acquisition. Piaget suggests that completion occurs around a mental age of fiteen. Students are not so much acquiring concepts as extending those they have acquired through a procedure of category expansion and exclusion and learning how to use them correctly.

This cognitive view of learning is based on the philosophy of knowledge called *genetic epistemology*. Piaget's collaborator, Inhelder (1962) describes the philosophy as follows :

> *"It is research work in which genetic epistemology seeks to analyse the mechanisms of the growth of knowledge in so far as it pertains to scientific thought and to discover the passage from states of least knowledge to those of the most advanced knowledge."*

A model of academic learning explaining how the passage from states of knowledge is achieved is proposed by Klausmeier (1971). He sees students' progression as dependent upon pre-requisite *mental operations* which are called *schemes* by Piaget and *an internal model* by Bruner.

Pre-requisite mental operations make possible a progression in conceptual understanding which has four cumulative stages. The first of these is the Piagetian *concrete operational level* which Klausmeier calls *concrete thought*. At this level a concept is inferred from recognition of a previously encountered object or idea and the thinking skills needed are those of attention; discrimination; internal representation, which is language and retention capabilty.

The second stage is reached when students can infer a concept from recognition of a previously encountered object or idea but perceived from a different angle or point of view and through a different sensory mode such as hearing rather than reading about an idea. The skills needed for this *preoperational thinking* stage are those of the previous stage with the addition of generalisation.

Piaget himself does not distinguish between these stages but describes them as a level of thinking characterised by the acquisition of object concepts. Gagne (1974), within his perspective of an eclectic behaviourist, supports Klausmeier's (1971) distinction but prefers alternative labels. He believes that thinking capability at these levels can be described as ability to make multiple discriminations and in this way he avoids recourse to *mentalistic* inference. Nevertheless, he does confirm the separateness of the stages to support Klausmeier's (1971) model.

The third stage which Klausmeier identifies is called *classificatory*. This stage is reached when learners can make generalisations about things in terms of like or unalikeness. An example is the child who can respond to two different examples of the same class of objects or ideas as equivilent.

The basis for classificatory decisions are perceptual attributes. The child learns which attributes are critical to the concept and which are incidental and to name the concept with a referent. An example would be learning that *big* is critical to *lorry* but a colour attribute value like *yellow* is not. In the case of specialised concepts like *National Coal Board lorry* the attribute value of colour is critical. In the same way the attribute *objective methodology* would be critical to students' acquisition and correct use of the concept *scientific theory*.

Some studies (Kagan and Kogan, 1970; Bruner, 1964) have suggested that there is a tendency for students to base classifications on different things in that some might select the general properties of the concept and others the specific or critical attributes which are held in common. The present Study examines this tendency, which is described as differences in approaches to learning.

Klausmeier's (1971) final stage is called a *formal thinking level*. Students who think formally can define concepts in terms of critical attributes and recognise the absence or presence of them in new ideas. An example is *evidence*. When students can discriminate between what does and does not count as evidence (examples of non evidence being opinion, superstition and belief) and can give socially agreed definitions of it, they are thinking at a formal level.

The classificatory and the formal levels of thinking are those most representative of thinking skills in Higher Education. Klausmeier suggests that students might have diverse approaches to attainment of this level. He calls this diversity a preference between using *inductive* or *deductive strategies*.

Inductive strategies are the evaluation of concepts in terms of the attributes present or the recognition of positive instances. The former type is called *inductive hypothesis testing* and the latter is called *commonality strategy* (Klausmeier, I97I).

Deductive strategies occur when all essential information is given in an expository way as in lecture contexts. The information is assimilated and used to evaluate examples and non examples of concepts. In practice this means that students are given names of concepts with verbal definitions and perhaps diagnostic aids, but no examples.

Ausubel et al (I978) distinguishes between modes of presentation available to lecturers and which he believes determine discriminably different approaches to learning. He calls these modes *expository* (sometimes called a traditional or reception method of teaching) and *discovery* (sometimes called a problem solving approach to learning).

Expository methods occur when tasks are presented in a final form without any independent discovery or great activity in learning. Ausubel et al (I978) suggest that the expository mode, provided it is related to what students already know, is the more appropriate for Higher Educational contexts because it demands greater cognitive maturity.

By this he means that the assimilation of abstract concepts is achieved without concrete experience. This requires formal thinking operations which are not readily available before adolescence. Students are seen as being required to do more than catalogue ready made concepts within this mode. Ausubel et al (1978) say that students need to make judgements of relevance to decide under which propositions to catalogue new information. Sometimes there is conflict and reconciliation between existing and new ideas is needed. Bruner (1966) describes this as follows :

"Students do not mechanically associate specific responses with specific stimuli but rather tend to infer principles or rules underlying the patterns which allow them to transform their learning to different problems."

Bruner's (1966) description of expository learning elevates it above the traditional caricature popularised by Victorian writers. For example, Dickens (1812-1870), in *Sketches By Boz, chapter 3*, refers to the educational practice of filling heads with facts as though they were empty recepticles. He describes the end product as achieving, *a smattering of everything and a knowledge of nothing.* Bruner's (1966) notion is that whilst expository learning can approach the level of rote regurgitation of facts and figures, it can also involve representational equivalence between symbols (as in chemistry or mathematics, for example) and their referent.

These ideas of Bruner and Ausubel have parallels with those of Fransson (1977) and Biggs (1978) who have independently observed the significance for learning that modes of presentation in teaching have. Fransson refers to levels of thinking emanating from expository teaching as *surface level* and thinking resulting from discovery teaching as *deep level*. Biggs (I978) describes the different modes as leading to *learning at an explanatory level of understanding*, and, *learning at an exploratory level of understanding*.

Ausubel et al (I978) Fransson (I977) and Biggs (I978) have examined the effects of preferred mode of presentation on student learning approaches and outcomes and in this there is a commonality in their work. Bruner has shown only a marginal interest in the notion of individual differences but the general opinion between them seems to be that evidence exists to support a belief that there is a predisposing set, or orientation, within students that determines a match or mismatch with teaching styles. Ausubel et al (I978) suggest that these orientations might have an origin in early socialisation experiences at home and school where early habits of learning are established.

Comment and Implications for the present Study

In the context of Higher Education, learning is defined as being meaningful. The criteria for meaningfulness is twofold, involving a notion of inherent meaning within the concept structures of knowledge and a notion of there being already existing and relevant cognitive structures within the learner.

Meaningful learning that is not meaningful expository learning might be claimed to be less centrally characteristic than meaningful discovery learning. This is not to say that undergraduates are not encouraged to think independently and creatively but that the objectives of their subject disciplines are primarily concerned with the acquisition of transmitted knowledge.

In this mode, the students assimilate new, given information through lectures and set reading, to expand the concepts already acquired and to learn how to use them correctly.

It is further suggested that, additional to the effect of presentation mode, individual differences comprising preferred strategies of learning occur in recognisable and measurable ways.

It is against this context that the present Study establishes its hypotheses for testing.

ii. Measurement *"In examinations the foolish ask questions that the wise cannot answer."*
(Oscar Wilde)

McCormick (I982), in a review of evaluation procedures used in education, comments that Higher Education has not shown much concern with the concept of measurement in recent years.

He suggests that the emphasis of the degree conferring bodies of the University Senate, the Council For National Academic Awards and the diploma conferring bodies of the Business and Technical Educational Councils, has been on curriculum planning rather than on curriculum evaluation.

Preston (I98I) has said that *accountability is only an issue in a crisis*, and, McCormick (I982) thinks that evaluation is assuming an unprecedented importance at the moment because of a crisis felt by institutions over a perceived need to be *accountable.*

Sizer (I979) addressing the Annual Conference of the Society for Research into Higher Education at Brighton Polytechnic, spoke of the need for universities and polytechnics to justify their activities and to account for their performance in terms of graduate output.

The attitude is summarised in a media statement (*The Financial Times, 30th October, I979)* as follows :

"The slogan of academic freedom does not justify the presumption that all universities are equal when it is clear they are not or that the options chosen by school leavers are the only possible guide to the allocation of expensive resources."

Institutional performance is most usually measured in the context of long term trends identified in the D.E.S.'s, *Higher Education In The I900's* (1978), but within institutional evaluation is assessed in terms of *efficiency* and *effectiveness.*

The relationship between efficiency, effectiveness and performance is complex. It might be argued that performance, measured as pass rates or degree classifications, is not the most appropriate criterion. However, it remains the most popular one.

Romney, Gray and Weldon (I978) suggest that examination performance is the most valuable index of learning achievement in students. It is seen as the fourth stage of learning processes which is preceded by the setting of objectives, the commitment of resources needed for achieving objects and the expansion of resources as required. They also believe that, *the art of measuring the outcomes remains in a distinctly primitive state.*

Sockett (I980, pp. I0-I2) supports this view although he accepts that graduates' examination results are generally held to be the means by which course and institutional success is judged. Simons (I98I) refers to the concept of assessment as an economic one in a system where resources are allocated in response to the institution's performance.

He says that this describes an accountability model based on product efficiency criteria. His debt to MacDonald (1978) and to Elliott (1980) is unacknowledged but similarity of views is apparent.

Critics argue that this model tells us nothing about what happens in the learning processes because attention is focused primarily on what students can be demonstrated to have learned. In other words, it detracts attention away from an evaluation of the quality of learning (Lawton, 1980).

An implication of this is that outcomes might not be the most appropriate criterion for evaluating student performance. Other indices could be more useful and their consideration as alternatives could require a redefinition of learning, with more emphasis on the experience of learning than on recall of what is learned.

A second implication is that techniques other than written examination answers might be preferable. This does not deny that summative assessment is appropriate but it questions the fact that written examination answers do not do it well enough.

The first of these implications involves a consideration of the prevailing ideology of education. Ideology, as a set of ideas and beliefs about the world demonstrated through peoples' behaviour, determines beliefs about the ways things are seen to be.

Postman and Weingarten (1969) have written that :

"It is generally believed that people of other tribes have been victimised by indoctrination while our tribe has remained free."

Ideologies of education describe ideas and beliefs about learning and the prevailing ideology is perhaps that of *Transmission ideology* (Barnes and Schemilt, 1974) which holds knowledge to exist in the form of subject fields and that assessment by examinations is appropriate. A result of this stress on product not processes of learning is suggested by the popular writer Holt (1969) to be *right answerism.* This notion of students learning to give right answers is supported by Postman and Weingarten (1969) who refer to it as an *unintended consequence* of the assessment model. Meighan (1982) calls it a *hidden curriculum* within education.

Holt (1969) documents techniques students might develop to get right answers and some fairly recent research (Miller and Parlett, 1974) demonstrates empirically how techniques are acquired by students for use in learning how to pass examinations.

Critics of the accountabiliy model have argued the need to adopt alternative models of assessment (Stenhouse, 1975; Elliott, 1980). The feeling is that the experience of learning should be given more prominence. McCormick (1982, p. 86) writes of the *dangerous* *oversimplification of education and evaluation* which otherwise exists. Miller and Parlett (1974, pp. 13-18) suggest that the increasing dissatisfaction felt by critics stem from this oversimplification. They write that :

"Testing educational effects under controlled conditions and giving numerical results presents an artificial and emaciated picture of real world educational life."

Alternative models shift emphasis to the lecturing learning interface. One such alternative theoretical model is that of Interactionist research on self evaluation (Delamont, 1976; Medley and Mitzel, 1963). Medley and Mitzel (1963, p. 247) show how this alternative model would refocus research investigations :

"The research worker limits himself to the manipulation and studying of antecedents and consequences ... but never once looks into the classroom to see how the learner actually learns."

This suggests that research should monitor what Sockett (1980, pp. 19-21) calls the *conditions of learning rather than the consequences of testing.* Becher and Maclure (1978, p. 211) refer to the trend it implies towards the sources of information being investigated rather than an emphasis on accumulating quantitative data of scores.

A methodological objection to this alternative is that evaluation becomes subjective and susceptible to distortion. There is more emphasis on course evaluation than on student performance and the lack of numerical data makes communication of results ambiguous and interpretation less precise.

It is probably because of criticisms like this that examinations have remained widely preferred to the alternatives. It is suggested (Shipman, 1979) that only when discrimination between graduates in terms of their academic performance becomes no longer useful will examinations become obsolete.

A second implication, raised earlier in this chapter, is that within the traditional model of examining there is room for improving the techniques used. Objections made by critics of examination papers are that the usual three hour unseen written essay style answer is only one of the available techniques. Variations on this include *seen papers* which are prepared answers; *open book* exams which are unseen but allow consultation of notes and texts, and *objective testing*. Of the latter technique it has been said (Barzun, 1959) :

"Objective tests are simply pointing. Taking them calls for the least effort of mind apart from that of keeping awake ... no other single practice explains as fully the intellectual defects of our students ... than their ingrained association of knowledge and thought with the scratching down of check marks on dotted lines."

Barzun (1959) continues to criticise objective testing with the comment that they are inappropriate to educational objectives :

"They disadvantage creative persons and some of those people, who

despite impressive gifts, do not shine at parlour games."

It is the case that objective testing is extremely sophisticated since the days when Barzun was writing and modern exponents talk of the more comprehensive coverage of syllabus and the greater precision in marking which they confer. However, as an alternative to the essay style examination answer, objective testing has not gained a precedence.

Another alternative is the use of essay type answers in examination contexts as a proportional,not complete,evaluation.This is the use of supplements to examination performance called *continuous assessment.* Sometimes, summative assessment is replaced with continuous assessment.

Difficulties arise with all the alternatives when comparisons between graduates finals papers are required. For research purposes it makes the notion of comparison of performance across faculties or departments or institutions absurd when the indices decided on by respective Examination Boards are not universally agreed. A more legitimate procedure is to use a common examination as the criterion but this has methodological problems of reliability and validity. The validity problems arise, in the research context, because a common examination could have little applicability to all the different subject groups of students. The reliability problems apply equally well to all forms of examining. This concerns the subjectivity of marking and problems of expectancy effects created by cues such as stereotypes of names (Lawson, 1971; McDavid and Hararri, 1966) and of handwriting (Marshall, 1967; Scannel and Marshall, 1966; Soloff, 1973).

Despite these problems of reliability in examining, comparison of student performance within departments and within courses, is a valid procedure. At degree level it is claimed that inter departmental and inter course comparison of student performance is possible through the assessment of achievement of a common ideal standard. This is called *criterion referenced* evaluation (Ausubel at al, 1978) and it is the basis for classifications. The classes describe equivalent levels of performance across different subject fields.

Comment and Implications for the present Study

A direct conclusion of the Literature on measurement in learning is that criteria are difficult to establish. Examination results are imperfect as a criterion because they reduce learning to a narrow conception of test scores as achievement measures and in so doing underemphasises learning experiences for learning products.

Academic achievement defined in this narrow way is said to be an inappropriate description. Even when alternative techniques are used the use of summative techniques is said to restrict learning.

Alternatives are difficult to establish because of their lack of communication and ambiguity in interpretation and so examinations, although imperfect, remain the most common form of assessment.

A research difficulty with examinations as a criterion of learning is that no consensus exists between departments and faculties of an institution, nor between institutions themselves, as to the ways in which Examination Boards determine the exact form of the examination and the procedures for combining marks. For this reason cross course comparisons of achievement is not valid when the examination performance is used as an index against which to measure the effects of independent variables like students' ability or motivation.

An implication is that the interrelationships existing between the independent variables themselves become of interest. The establishment of relationships existing between independent variables and between an independent variable and the dependent variable of learning within the context of particular courses, can be functional. This functional role develops from the explanatory and predictive aims of research but research does not have to justify its utility in this way. A prescriptive role is sometimes said to be beyond the brief of behavioural sciences and so the description of study habits and learning becomes of value in its own right.

2.3 LEARNING STRATEGIES

i. Definition

> *"Where the statue stood of Newton, with his prism and silent face. The marble index of a mind forever voyaging through strange seas of thought, alone."*
>
> *(Wordsworth (I770-85, The Prelude, bk. 3)*

Learning strategies describe the processes by which new ideas are acquired and existing ones expanded. The Literature has used alternative terminology to describe these processes. *Learning styles* has sometimes been preferred as has the terminology *cognitive styles*.

It appears to be preference alone that decides the choice of terminology rather than semantics with as much variation in content and method of studies using the same terms as between studies using alternatives. The linguistic choice does not define alternative research concerns.

Laurillard (I979) suggests that confusion over labels should be resolved through conceptual differentiation between *strategy* and *style* and calls for a more precise use of the terms which ought not be used synonymously. She believes that *strategy* has connotations suggestive of a more executive function involving rules.

Messick (I976, pp. 6-9) provides a glossary of over nineteen names used throughout the Literature in descriptions of concept learning processes. These range from definitions of what Laurillard calls *style* to what she calls *strategy*. Messick (1976, p. 7) writes :

"*Although cognitive styles are viewed as habitual modes of information processing, they are not simple habits ... It is important to distinguish cognitive styles which are high level heuristics that organise and control behaviour across a wide variety of situations from cognitive strategies which are ... a function of the conditions of the particular situation.*"

The suggestion seems to be that *style* is pervasive and perhaps temperamentally related while *strategy* is decisive and goal directed. This pervasiveness of style is seen in the summary of Messick's (1976) review described by Harre (1983). Harre categorises the definitions of style in three broad groups. They are as follows :

(a) styles which are related to the ability to perform specific tasks and which are assessed by accuracy in performance. An example of this is Witkin"s (1977) *field dependence and field independence* describing the tendancy to approach things in an analytic or a global way and measured by the ability to distnguish figure from ground;

(b) styles which differ in the value attributed to them. An example is *cognitive complexity and simplicity* (Goldstein and Blackman, 1977) describing ways in which events and social behaviour can be organised. It is suggested that, in the processing of academic information, a cognitively complex style is most appropriate;

(c) styles that do not relate to ability nor are attributable to value decisions. These include *breadth of categorisation* (Wallach and Kagan, 1965) describing the tendancy to think of specified categories as broad and inclusive or narrow and exclusive.

Other studies have perceived styles to be pervasive and typical ways of behaving but have added a dimension of maturational readiness to adopt styles. Kogan (1976) says that there is confusion in the Literature as to whether it is ability or maturation which predisposes styles. He writes that, *"We need to separate preference from capability"*. Wallach and Kagan's (1965) study describes styles as characteristic ways of grouping together objects and ideas. Some individuals base their judgements on concrete properties *(hard things; have knobs on)* while others use analytic properties *(for cutting with)* or relational properties *(they go together)*.

They believe that preference for conceptualisation based on concrete properties occurs in young age groups which is supportive of an age trend in cognitive styles. Klausmeier (1971) confirms this.

Klausmeier (1971) found that children have to construct alternatives in conceptualisation before they can chose between them. Styles are preferences for basing judgements on concrete properties after abstract ones have been recognised. Kogan (1976, p. 115) writes :

> *"The time would be ripe for a re-orientation of research into styles of conceptualisation. Let us determine not only what the child prefers to do but what he is capable of doing. Let us depart from a rigidly unilinear model in which styles, more or less mature, follow from one another according to a developmental timetable ... Instead let us explore the balance and patterning of styles within individuals ... recognising that all styles may be present simultaneously."*

The suggestion is that children who use concrete properties might be able to use abstract ones should they chose to do so.

The Literature has no consensus about the specificity of styles within individuals and is in disagreement concerning the exact meaning of the term. Similarly, there is lack of agreement about the notion that styles are individual characteristics at all. The opposing view is that particular ways of thinking are task determined and not person related.

If styles or strategies are seen as individual difference variables then several implications follow. Firstly, they must be relatively permanent and identifiably distinct for purposes of measurement. Secondly, if an association with learning criteria can be established certain ones might emerge as more efficient than others. This would have diagnostic potential. Thirdly, if styles or strategies are seen as being brought to the learning context, some will be more appropriate than others for classroom learning. This could involve a notion of discrepancy or compatability between teaching and learning styles.

Alternatively, if styles or strategies are considered to be a function of task requirements then the following implications occur.

Firstly, if they are task determined, little variation should exist between the learning approaches of different students undertaking the same task. It can be supposed that different strategies might emerge because differences in perceptions concerning task requirements occur. This consideration is limited by two qualifying factors.
In the first place, the student sample used in research studies of concept acquisition tasks where different approaches have been described, has been relatively homogeneous in terms of ability and

previous attainment; in the second place, the types of problems set have been fairly unambiguous and simple so allowing little scope for idiosyncratic interpretations of task requirements.

A second implication is that should variation occur in the strategies used by the same student across different tasks, some evidence is established for strategies being task related. The only consistency anticipated is that holding between approaches to highly similar tasks. Some support for this comes from the research of Williams (I983) who describes how *subsets of strategies* are available to students rather than a single *synoptic strategy*. Learning performance is contingent on the number and flexibility of strategies available at any one time.

The suggestion that strategies or styles do not exist as individual difference characteristics but are emergent processes of thinking from specific tasks, does not seem a reasonable alternative to the earlier viewpoint.Evidence would need to be established that learning is without generalisation and that its occurrence is unique in every instant. An analogy is that of a general who goes into battle with ammunition and troops but no plan of attack or experience of possible manoevres he can use. The strategist general, on the other hand, is the general with plan(s), usually based on battle experience, which he can put into effective operation with some anticipation of success.

However, it is reasonable to think of approaches being affected in some degree by the situational constraints and the specific requirements of the task in hand. This is to acknowledge the effects of experimental variables in concept identification tasks aimed at measurement of learning approaches which the Literature (Goldstein and Blackman, 1977; Heidbreder, I924; Bourne, I966; Glanzer and Clark, I963; Shepp and Zeaman, I966) does. Some of these situational and task variables are considered as follows :

Task variables in concept identification studies

There are a number of experimental variables which are important in concept identification experiments. A major variable is that of,

(a) cue saliency.

It has been observed (Goldstein, I94I) that subjects do not chose randomly from possible cues presented to them in concept identification experiments. Subjects' habitual ways of thinking and the characteristics of the task itself affect the choices made.

The characteristics of tasks affecting attentional value, called *saliency* of cues, can be explained in various ways. One hypothesis with roots in introspective philosophy, holds that the more concrete a stimulus cue is then the more likely it is to be used by subjects in discrimination tasks. The more abstract a cue then the more difficult it is to use and the less likely it is to be chosen (Goldstein, I94I).

Some support for this is found in the work of Heidbreder (I946).

She suggests that the attentional value of a cue is determined by its *thing character*. Heidbreder's concept identification experiments showed that subjects found it easier to learn concepts defined on the basis of object classes and more difficult to learn concepts defined on the basis of form or colour. She concluded that this thing character of cues influences concept acquisition.

Baum (I954) considers it more appropriate to assume that perceptual complexity is the basic variable in Heidbreder's experiments and not a thing character. He suggests that it is perceptual distinctiveness that determines speed of concept identification. Heidbreder later acknowledged that perceptual features influence facility of identification and that being able to verbalise critical features or cues makes for more efficient learning (Heidbreder, I949).

This observation is supported in more contemporary work by Glanzer and Clark (I963) who describe a *verbal loop hypothesis* stating that the difficulty of concept identification is correlated with the degree of difficulty in describing relevant features or cues of the stimulus figure in the task. A recent study by Roth and Shoben (I983) broadly confirms this. They examine the effect of context on the representativeness of exemplars of a category and find that the ease with which an exemplar is identified depends on its context. Specifically, the degree of relatedness of an exemplar with its category and its order of presentation in a recognition task affects the ease of solution.

The importance of perceptual features determining cue saliency is further demonstrated by Shepp and Zeaman (1966) who argue that attention is determined by the size of perceptual differences between cues. An example is that a brightness cue will have higher attentional value if the attributes are black and white as opposed to being black and grey. Similarly, a size cue which contrasts large differences will lead to faster concept identification than a small contrast will.

(b) emphasis.

The hypothesis is that perceptual features determine the attentional value of cues and this has been supported by studies in which perceptual emphasis of relevant cues has been made (Hull, 1920; Trabasso, 1963). Hull's method was to colour the relevant cues in order to make them stand out. Trabasso's was similar in that he used drawings of flowers in which the relevant cue (eg. the angle of the stem) was coloured for emphasis. In both the Hull and the Trabasso experiments, performance in concept identification tasks was much improved when cue emphasis was used.

Another finding of Hull (1920) is that learning performance improves when problems are presented in a certain order. The presentation of simple problems first and harder ones in a progressively graded order, tends to result in superior outcomes. An implication is that students need the right kind of coding response which teachers can manipulate.

A teaching implication is that presentation of complex ideas first, before exploring simpler level ideas and examples, is predictably inefficient and could inhibit learning.

Additional support for this is provided by Bruner and Potter (1964) who determined recognition thresholds in perceptual identification experiments. They found that if subjects are presented with a focused picture which gradually goes out of focus and back again, recognition of the stimulus is more difficult when presented initially as an unfocused picture. The clearer image needs to be presented first for efficient identification.

(c) stimulus variability.

The notion of *stimulus variability* concerns the notion that the greater the number of cues presented in identification tasks, the easier the task is to solve.

An explanation is that problems can be solved by paying attention to any one of all the relevant features. For example, if the task involves identification of critical attributes when all *large figures* are also *shaded figures* and also *square figures* the subject has a choice of colour, size,shape or all three in varying combinations from which to select the hypotheses to test out.

This should lead to solution more quickly than if only one or two attributes were used. It appears to be the case that adding irrelevant features makes the concept more difficult to identify (Bourne, 1966). Bourne found that if in concept identification experiments the attributes of shape and colour appear but that the critical attribute is size, the attributes of shape and colour as potential hypotheses retard identification by increasing the number of responses which are needed to eliminate wrong hypotheses.

Comment and Implications for the present Study

The Literature on the task variables of cue saliency, emphasis and stimulus variability suggests that to ignore the effects of the learning material and context on approaches to learning is naive. This is not to underemphasise the existence of preferences and habits in approaches demonstrated by students which is discussed in the next chapter, but it does emphasise the need to consider factors external to the learner.

In the context of research and implications for teaching, these external factors can be seen to extend globally around the learning situation to encompass course and departmental or faculty membership reflecting differences in task requirements.

It is important to clarify the use of terminology for describing preferred approaches as the Literature is imprecise. There appears to be little or no difference semantically between the different terms used to describe approaches although arguably there ought be a conceptual distinction made.

ii Measurement

> *"I must confess that a man is guilty of unpardonable ignorance who concludes that because an argument has escaped him that it therefore does not exist."*
>
> *(Hume, I748)*

The notion of there being identifiable and measurable differences in the ways in which students acquire and use concepts has a history of concern. Bruner et al (I956, p.2) have referred to concept learning as *acts of invention*, implying an active role for learners in processes of acquisition. He describes these acts of invention in the following way :

"What happens when an intelligent human being seeks to sort out the environment into significant classes and events so that he may end by treating discriminably different things as equivalents."

Kintsch (I966) supports the active learner view suggested by Bruner when he describes concept learning as a *search process*, in which the learner goes beyond the information given to achieve concepts, described by Bruner (I956) as achieving *generalised understandings*.

Accounts of how this comes about are not universally agreed. Kurtz (I969) comments on the lack of consensus in the following way :

"The conceptual adequacy of 'cognitive styles' and its related concepts has been questioned."

Floyd (I976), in her review of the Literature, gives a resume of studies representative of different interpretations of cognitive styles and their measurement. The methodological and conceptual differences between the views represented supports Kurtz's (1969) beliefs about the vagueness of the construct.

Laurillard (1979) goes further than Kurtz in claiming a conceptual inadequacy of *cognitive styles* as a description of individual approaches to learning. She sees the lack of agreement over what form these approaches take and the methods of measurement as evidence for styles being task not person related.

These different interpretations are considered in the Chapter concerned with a literature review of cognitive styles. Some of the theoretical approaches behind methods of measuring styles in relationship to concept identification tasks is considered here. One of the earliest of these approaches is the *Coding theory* of Hull (1920).

Coding Theory

Hull (1920) believed that a coding response is made in concept identification experiments by the subjects. The experimenter presents stimulus cards showing, for example, a *square figure*, and gives a verbal instruction that group to which it belongs is called *Class A*. Subjects are assumed to code the response in terms of squareness and to associate it with Class A things when they have been able to say, *Square is A*.

Hull pioneered the experimental work in concept identification experiments and he popularised the view that concept identification can be interpreted as the associating of a common response to stimulus figures which are similar in respect to one common feature but dissimilar in other respects. This viewpoint was later to be severly criticised in future research developments.

Heidbreder (I924), for example, was critical of the Behaviourist perspective of Hull and called it naive in its treatment of the subject as passive in receiving information and needing simply to memorise the positive and negative cues presented with the task.

Despite his discredited status, Hull is still credited with helping to bring about a methodological revolution in the research into concept learning which had, until his time, relied on introspective accounts.

Heidbreder's (I924) new perspective was to perceive subjects as active participants in what Klahr (I976) calls, *the knowledge getting process*. Participation involves the selection and transformation of presented information into hypotheses which are constructed for testing and subsequent modification or rejection.

Heidbreder's alternative approach assumes that subjects in experimental tasks make guesses about the problem to be solved which are consistent with the information given. Although she is rarely described as a *Hypothesis testing* theorist, this is the theoretical rationale which she adopts. Hypothesis testing theory is most commonly attributed to Restle (1962) whose ideas are as follows.

Hypothesis Testing Theory

The first formulation of this theoretical approach is attributed to Restle (1962). He assumes that subjects in concept identification tasks take a few of the many possible hypotheses available in order to test them out.

An hypothesis leading to a correct response,followed by positive reinforcement from the experimenter, is retained while those that lead to error and negative reinforcement, are rejected.

Restle sees this assumption as having three dimensions. Firstly, an hypothesis can be correct,secondly, it can be incorrect, and thirdly, it can be irrelevant. Solution to problems is achieved when a subject can eliminate incorrect and irrelevant hypotheses and identify correct ones. This assumption implies that there are three possible ways in which a subject can sample available hypotheses to make the selections.

Restle identifies these as follows. Firstly, a subject could test one hypothesis at a time. If the hypothesis is correct then the problem is solved but if it is incorrect it needs to be replaced with a new one after having been rejected. Alternatively, a subject could test all the hypotheses together and attempt to reject all those inconsistent with the information given. So long as a subject has more than one strategy of testing out hypotheses, the probability of making a correct response is equal to the proportion of strategies leading to the response being made.

Thirdly, a subject could randomly select a subset of hypotheses, trying to reject wrong ones from these. If the sample chosen includes a correct hypothesis the problem is solved but if it does not the subject must take a new subset when all those in the first sample have been eliminated.

These possibilities for testing might be supposed to involve different psychological processes. Restle does not think so and demonstrates that they have a mathematical equivalence in that they make identical predictions in simple concept learning tasks concerning the probability of response sequence.

Hull (1920) was critical of the notion that subjects have clearly formulated plans in mind when identifying concepts in experimental tasks. He believed that subjects often reach solutions without being able to give verbal explanations about how they did it. He interprets this as evidence for believing that solution is achieved without recognition of rules which are said to govern the identification of the concept. More recent research opinion (Bruner, 1956; Bruner and Anglin, 1973) tends towards acceptance of the inferred rule view of Heidbreder. Bruner and Anglin (1973) write that :

"Individuals do not mechanically associate specific responses with specific stimuli but rather tend to infer principles or rules underlying the problem which allow them to transfer their learning to different problems."

Comment and Implications for the present Study

It is the hypothesis testing theory of Heidbreder and Restle which is the rationale underlying the concept identification strategies described and measured in the present Study.

Subjects are perceived as actively involved in the selection and testing of hypotheses or guesses in processes of concept identification. The different ways in which these hypotheses can be tested, as for example the testing of a single hypothesis at a time or of a subset of hypotheses together, is a focus of special interest within the Study.

CHAPTER THREE : METHODOLOGICAL BASES OF RESEARCH

"Cheshire Puss", she began, "Would you please tell me which way I ought to walk from here?"

"That depends a great deal on where you want to get to", said the Cat.

"I don't much care where", said Alice.

"Then it doesn't matter which way you walk", said the Cat, "So long as I get somewhere", Alice added as an explanation.

"Oh, you're sure to do that", said the Cat, "If you only walk long enough."

(Lewis Carroll, Alice In Wonderland)

In The Literature

Directions in research design are undergoing something of a rethink in the behavioural sciences. Cronbach (1974) refers to this as an inevitable reaction to a perceived failure of traditional *model building* research to account for complex human behaviours.

It is suggested that behaviour is not realistically reduced to general laws of explanation and prediction because it is not possible to establish isolated components of behaviour appropriate for experimental design. Cronbach (1964, pp. 116-27) describes the complexity of human behaviour when he writes that :

> *"Once we attend to interactions we enter a hall of mirrors that extends to infinity."*

In seeking alternatives to traditional experimental design the question of the nature of the phenomenon to be investigated needs to be considered. Sutherland (1973) discusses this and observes that a major investigative aim of research is prediction and that it is implicitly assumed that the phenomenon to be predicted is probabilistic. This means that a knowledge of causes will predict the behaviour within a probable range of error.

Sutherland (1973) goes on to suggest that if the phenomenon being observed is not probabilistic it is not subject to universally generalisable laws and no amount of research will give a basis for prediction.

This consideration directly affects the suitability of measurement techniques. If phenomenon is assumed to be probabilistic the techniques most suitable are experimental, quasi experimental and correlational techniques. These are designed to make generalisable laws applicable to contexts remote from that of the original study.

Sutherland (I973) calls this kind of research design *distal*. It contrasts with a research design that restricts its generalisations to contexts identical with, or highly similar to, that of the original study. It is called *proximal* and applies to non probabilistic phenomenon.

The point made is that early research questions centre around the controversy of which design, proximal or distal, is the relevant choice for the phenomenon to be investigated. Some guidelines have been put forward (Van Mondfrans, I977, p. 48) which are :

(a) judgements need to be made about the nature of the phenomenon and these are based on observations in the preparatory stages;

(b) a review of the literature provides a history of evidence giving consistent and well defined results of previous studies;

(c) pragmatic arguments concerning the resource cost needs discussion.

Sutherland (I973) discusses these guidlines commenting that proximal research emerges as the most relevant alternative when the investigator finds more negative than positive responses to the point in Van Mondfrans's summary. Sutherland adds that most educational research studies are proximal. ie. They establish contextually valid predictions only.

Comment and Implications for the present Study

The present Study considers the nature of the phenomenon to be investigated and the alternatives of research design which can be used. It is assumed that research within educational psychology is an evaluative enquiry aimed at solving problems in classroom contexts and at the establishment of contextually valid predictions.

This description has caused some researchers (Suchman, I97I, p. 45) to call it an *evaluative research* methodology because of the instrumental value it has:

> *"Evaluative research applies the scientific method to problems which have administrative consequences whereas basic research is concerned with the problems of theoretical significance."*

It may be said that evaluative and basic science research differ only in purpose but not in procedures. Cronbach (I964) says something similar to this when he claims that evaluative enquiry gives information needed for decision making processes but not for establishing laws. Stufflebeam (I97I, p. 22) writes that :

> *"The evaluator seeks data from a variety of perspectives ... under diverse and frequently adverse conditions in the septic world of the classroom and school. He does not reduce the variables so he can study them in the antiseptic world of the laboratory."*

Although Stufflebeam sees the two as disparate there is support for Cronbach's views from Kaplan (I964, p. 339) who says that :

"An enquiry which is specifically directed towards the solution of some practical problem is not for that reason alone to be excluded from the category of basic research and science."

Cronbach (I964) suggests that the important thing to do is to adopt a research method that looks at *interpretation in context* and assumes educational research phenomena to be non probabilistic and for its results to generalise to only highly similar contexts.

Hamilton (I968) sees this interpretation in context as a response to a growing need within the behavioural sciences to produce relevant results. This has the effect, he argues, of legitimising techniques of data collection of account information and interviews. This qualitative data has been traditionally excluded from major studies and Hamilton sees its growing acceptability as constituting a new *paradigm* for research.

Parlett (I974) describes the new trend in the following way :

"Inventory programmes, even for research programmes, cannot sensibly be separated from the learning milieu of which they become a part."

Critics of this new trend comment on the lack of rigor which they feel charactertises qualitative research and so reduces the reliability of its data. Criticisms include the following points :

(a) reliability and interpretation of account information is suspect;

(b) there are problems in data collection when the subjects are inarticulate or have difficulty bringing things into conscious review;

(c) there is a lack of conformity to scientific method in that there is no establishment of cause and effect relationships and no generation of hypotheses to test because research aims tend to be exploratory and not predictive.

(Interestingly enough, Freud's answer when this latter criticism was directed towards his introspective methodology was , *"If introspection cannot conform to the tenets of modern science, so much the worse for modern science."*) Comparison is made, by the critics, with the advantages of quantitative methods. These are summarised as follows :

(a) there is high reliability and validity of test materials and a minimal interference effect from tester-observers;

(b) there is an established predictive validity for test materials;

(c) research tends to be large scale and to establish trends and generalisations applicable to other contexts;

(d) it generates the possibility of exploring the interrelationships between independent variables as well as between independent variable and the dependent variable.

Entwistle (1974) warns against an over reaction away from quantitative methods in an abandonment of all objective test results. He feels that an exclusively qualitative evidence base has problems of reliability. Some of the difficulties with it are as follows :

(a) qualitative observations are restricted to overt behaviours and they are liable to misinterpretation;

(b) there is often a reliance on artificial, experimental tasks which are irrelevant to real life learning contexts;

(c) results are expressed as nomothetic trends which may reveal nothing about individual performance;

(d) there are problems in explaining atypical findings because nomothetic research is concerned with hypothetical averages.

(Undergraduates are familiar with this latter point, expressed as the Harvard law of animal behaviour stating that, *"Under the most tightly controlled laboratory conditions, the rat does as it damn well pleases."* The existence of exceptions to the rule, which are not easily accommodated by laws governing behaviour, is sometimes problematic for scientific theories.)

A qualitative research approach has certain advantages over an exclusively quantitative one when seen in the light of the above points. Some of these advantages can be described as follows :

(a) it can be more insightful in explaining complex behaviours. Ornstein (I972) once remarked that scientific methods miss out on all that is interesting about a person;

(b) findings might be more ecologically valid because it tends to use natural situations where the behaviours occur normally;

(c) it more easily adapts to a holistic perspective in which context dependent behaviour is acknowledged and in which the subject is active in feeding back information.

There is evidence in the Literature of studies which use a combination of qualitative and quantitative methods. Biggs (I979) investigates correlates of study behaviour using correlational techniques and also uses illustrative case history material and some interview account information.

Laurillard (I979) is an example of a researcher going further than Biggs in the use of qualitative data. She quotes from research by Parlett (I970) to justify her choice of design :

"Students do not merely respond to presented content and to tasks assigned. Rather, they tend to adapt to and work within the learning milieu taken as an interrelated whole."

Laurillard reviews previous studies which have used qualitative material as evidence for the description of aspects of students' behaviours. These are summarised in her review as studies which :

(a) observe student perception of learning requirements (Miller and Parlett, I974);

(b) observe group identity and discussion strategies in group work (Parlett, I970);

(c) observe hidden curriculum and its effects on grading procedures (Snyder, I97I);

(d) observe teachers' attitudes and the effect on student assessment (Laurillard, I978).

A common underlying feature of these types of studies is that the students' perceptions about learning requirements is seen to have an effect on their learning performance. A quantitative research design might have missed this altogether.

An implication, for Laurillard, is that a nomothetic perspective using quantitative design will not do. She opts instead for a purely idiographic perspective using all qualitative data and with a total abandonment of all quantitative data. She acknowledges a methodological debt to Marton and Saljo (I976) and Fransson (I977).

Qualitative research has been described as a *new paradigm* (Hamilton, I968). Kuhn (I962) describes a paradigm as meaning something more successful than a competitor in solving problems, defined as acute. Laurillard calls the status of this so called new paradigm, *putative* because it stands only in respect of the failure of the old. Others might question whether it constitutes a paradigm at all because there is not enough work to justify its success. Hamilton (1968) discusses how qualitative research tends to be exploratory and to generate rather than test, theory.

There is an academic respectability for exploratory research, with roots of this respectability beginning in the work of Becker (1968). Popper (1976) has written that :

"There is no natural demarcation between observational and theoretical propositions."

There are also strong critics of qualitative studies. Entwistle (1970), in a critical review of a study by Perry in the 1960's, writes that :

"The study is weakened by an exclusive reliance on impressionistic interview data."

An alternative to using a wholly qualitative design or a completely correlational, quantitative one, is to adopt a combination along the lines used by Biggs (1979). The use of impressionistic observations in a supplementary role gives a face validity to the quantitative results and provides illustrative material.

The present Study uses a mainly quantitative methodology with the methodological advantages referred to earlier and with the potential for some transfer of results to highly similar contexts. It also uses some qualitative material in a supplementary role and with the intention of producing a more rounded and insightful account of students' study habits and approaches to learning within a polytechnic context.

CHAPTER FOUR : LITERATURE REVIEW

"It's a pity that Chawcer, who had genius, was so unedicated. He's the wuss speller I know."

(Artemus Ward, I834-67, In London, chapt. 4, 'At the tomb of Shakespeare')

There is a history of concern in both the study habits of students and the learning approaches they characteristically use.

(a) STUDY HABITS

In a brief review of some early research investigations into study habits (Entwistle, 1983, p. 65) it is observed that methodologically and substantively the early work has little commonality apart from an emphasis on making students aware of their study habits and on establishing evidence on which to base beliefs about how students learn.

A consideration of the Literature suggests that previous studies can be classified as belonging to one of two kinds. The distinction is made on the basis of methodology.

The first kind of study is characterised by being relatively large scale in which study habits are described and measured with psychometric instruments like inventories and objective tests (Eysenck, 1979; Entwistle and Wilson, 1970; Biggs, 1978; Entwistle, 1983).

The second kind of study adopts an intense, observational procedure of describing students' learning methods *in situ*. These might take the form of case studies or impressionistic accounts of study habits in context (Marton and Saljo, 1976; Laurillard, 1979).

These two approaches are not mutually exclusive and there is some evidence of studies using them in a complementary way (Biggs, 1979). When this occurs a study is identified as belonging within the one category of research but acknowledging a *conceptual debt*, to use Bigg's terminology, to the other.

An assumption of the first kind of study is that by the time students get into Higher Education they have developed fairly stable motives for studying and techniques of study behaviours. A second assumption is that these motives and habits arise out of a variety of personal factors including previous learning experiences.

An early review by May (1923, pp. 429-40), in the *British Journal of Psychology*, suggests that many of the early studies into study methods are based on the simple assumption that there are *good habits* which boost academic performance and *poor habits* which despress it.

Some contemporary research supports this assumption. Cooper and Foy (1969) describe how lecturers have stereotypes of students' study habits :

"Most university lecturers would agree that the way in which an undergraduate studies has a critical effect on his final degree classification."

Good study habits have been variously defined in terms of efficient note taking (Erasmus, 1978), making efficient use of textbooks (Buzan, 1974) and having specific skills in the te chniques of examination revision and essay writing under examination conditions (Maddox, 1967; Rowntree, 1976; Parsons, 1976; Burnett, 1979). A students' guide book (Cassie and Constantine, 1977) emphasises good lecture notes and effective examination revision as being of utmost importance for academic achievement.

One of the earliest references to study habits in the research Literature is that appearing in a Report on assessment published by the *Scottish Council for Research in Education* (1934). The Report suggests that the low correlations established between anticipated and actual student performance by lecturers might be due to the presence of *"a special factor of examination ability"*. Consequently the Report recommended that :

> *"A direct study of these questions is of obvious necessity and little can be usefully said about what the outcomes of such a study might be."*

The impetus for research into the questions suggested by the Report probably came about as also due to the growing dissatisfaction with existing predictors of academic achievement like ability testing.

As early as 1924 it was acknowledged (May, 1924, p. 429) that some students with high intelligence do less well in examinations than students with lower intelligence, a finding which was not predictable.

An explanation was advanced along the lines of what May (1924) called *"a tendency to least effort"*. This refers to the observation made in the Study that students with I.Q.'s at or below the mean tended to study for longer periods of time than students whose I.Q.'s were above the mean. In other words, students with less ability than others seemed to have the perception that working longer hours compensates for ability factors. May (I924) argues for this point of view and identifies length of time spent studying as a significant study habit.

Studies since the nineteen twenties have identified various habits as being more or less important than others. Noall (I962) describes the skills of listening in lectures, reading and note taking as being of special importance. Noall compares the effectiveness of these habits when immediate recall is used to establish that learning has occurred. Under these conditions he establishes that reading is superior to listening and to listening with note taking.

This does not wholly support the work of Arnold (I942) who found no evidence to suggest the superiority of any one study habit. Arnold compared the effectiveness of four separate study habits in a sample population of Liberal Arts College students during the Autumn Term of I94I. The study habits observed were reading textbooks; reading with note taking; reading with underlining and reading with margin note making.

Results indicate that a general trend towards the higher ranking of reading with underlining exists in different groups of students classified as high and lower ability groups. He further establishes that superiority exists in conditions of both immediate and delayed recall. The difference reported, however, was fairly small.

Support for a superiority of reading as a study skill exists in the Literature (Clemens and Oelke, 1967). A conceptual weakness of the earlier studies is the implicit assumption, referred to earlier, that students who do well in examination performance have the same or similar patterning of habits. Contemporary research opinion does not support this viewpoint. Entwistle (1983) has said that :

"Good students work in diverse but characteristic ways."

Some students have specific problems with particular habits like ineffective revision or inappropriate examination techniques but others might have more general and pervasive problems that are related to motivation or to emotional instability.

Treppa (1973) has suggested that there is a relationship between study habits and emotional stability. He found that students identified as having ineffective study habits and enrolled on study skills courses often have no history of underachivement but often have adjustment problems similar to those of underachievers.

Treppa (1973, p. 550) describes these students as *academically apprehensive* and suggests that they enrol on study habits courses because they perceive themselves as lacking competence academically when their actual problems are of self confidence.

Robyak (1978) offers support for Treppa's observations. In his own Study the relationship of emotional adjustment with academic performance in students attending study skills instruction, establishes evidence of what he calls *an interaction of management skills* to exist. An incidental finding in the Robyak Study is that a difference occurs between the description of study habits students report they have and those they are shown to have by psychometric testing.

Weigel and Weigel (1967, pp. 78-80) find the same discrepancy in their study of underachievers. Students in their sample gave self reports of effective study skills demonstrating that they knew about good study habits and yet they were revealed as having ineffective study habits in test scores on the Brown Holtzman SSHA.

The Weigel and Weigel data compared the scores students got when responding to the Inventory in an ideal way and then responding to it as themselves. Scores tended to bunch at the thirtieth to fortieth percentile when students responded as themselves, but at the ninety fourth percentile when they responded as ideal students.

An implication of this is that while students might not need more information about effective study habits, they might well benefit from instruction in their use.

There is criticism in the Literature of too much importance being attached to study habits as a factor in academic success. Entwistle (1960) describes how some students, identified as possible failures and given remedial help in study techniques, do not improve in their subsequent performance. He argues that one interpretation of this non improvement is that other factors outweigh those of study skill. Another interpretation is that students attending remedial courses in study techniques constitute a special group defined by their membership to the course and that they might have emotional problems which are unresolved with the improvement in study techniques (Treppa, 1973).

Emerging here is a criticism that considering study habits as a single independent variable of academic achievement is an over simplification (Biggs, 1977). An alternative is to consider study habits as one in a matrix of variables interrelating with learning outcomes. This extends a focus of investigative research out to a consideration of associated variables in what has been described as an extended model of research (Biggs, 1978).

Bigg's model identifies study habits as a set of variables which intermediate between what he describes as the determining factors of individual difference characteristics and the institutional characteristics of the learning context. Biggs suggests that student and context, what he calls the *presage*, affect learning *processes* and determine learning *products*.

The model has its roots in the Lewinian notion that behaviour is an interactive function of the learner and learner's environment. The determinants of learner and contextual features interact dynamically to produce changes in behaviours.

An assumption is that motives and strategies of learning are generated by unique characteristics of the learner and the task. It implies that variability between learners makes for variability in learning approaches.

A conclusion to be draw from the work of Biggs, which is something of a watershed between the older type studies and the new, is that study habits are not a single independent variable of learning. They are one in a patterning of interrelated variables with a concomitant effect on academic achievement.

Efficient study habits might be a necessary condition of academic success but they do not count as necessary and sufficient. An implication of this for future research is that a wider focus needs to be defined which will encompass biographical and contextual data.

Students in informal discussion (unpublished notes) talk about the need for good study habits but also about the importance of stable social and emotional relationships. They identify success as many faceted and do not perceive good habits alone as any guarantee of success. The use of additional techniques like interviews to supplement inventory data would seem a useful extension to the traditional research tools (Thoday, 1967). The suggestion is that traditional research has a limited scope for interpretation of results and that study habits are more complex than a simple instrument like an inventory can show.

Summary

I. Study habits can be shown to relate independently to academic achievement at the level of higher education (Entwistle and Wilson, I978) but the relationship is not always upheld by studies.

2. Some studies suggest that students who fail examinations and who do badly academically have sometimes got inefficient study habits (Maddox, I963). However, good students sometimes do not consciously review their study habits (Lafitte, I963).

3. There does not seem to be a consistent patterning of study habits for students described as 'good'. The notion that academically successful students follow the same techniques is false (Entwistle, I97I).

4. Studies in the Literature can be grouped into two broad classes. There are those claiming an important relationship between habits and performance and those that do not.

5. The American research generally supports the hypothesis that a relationships holds whilst the British studies generally do not.

6. One study (Gibbons and Savage, I965) found that when the same inventory was used with American and with British students, different results were found for correlations between test scores and examination performance.

7. Possible reasons for the discrepancy are suggested to be (a) the investigators use norms inappropriate to the one population, and, (b) the criterion used is different in the two contexts.

8. Despite the methodological similarity of the studies in the Literature (the scientific nature of the inquiry) there are methodological differences in the identification of habits and in the measurement scales used.

9. The trend is towards considering study habits as one in a matrix of variables affecting academic performance.

4.I Study Habits and Ability Variables

"I have nothing to declare but my genius."
(Oscar Wilde, I9I8)

The Literature defines "ability" in more than one way. Some define ability in terms of measured intelligence or aptitude (Gallessich, I970; Lavin, I965; Roberts, Meier, Santogrossi, I978). Others define it in terms of previous academic performance like A level points (Gibbons and Savage, I965; Ahman, Smith and Glock, I958).

4.I.I Ability defined as measured intelligence

Traditionally there has been little doubt in the minds of lecturers and laymen that intelligence is one of the factors distinguishing *good* from *poor* students.

This assumption underlines much of the early research into forecasters of academic achivement. McKeen-Cattell (I906) is mentioned by Eysenck (I947) as being the first advocate of using measured ability to predict academic potential. He was influenced in this by his visit to Wundt's laboratory where mental testing was pioneered.

Wissler (I90I) put the suggestion of McKeen-Cattell about the usefulness of intelligence quotient into practice but failed to find any positive relationship between prognosis and subsequent performance.

With the exception of a few isolated attempts to apply the Binet

Intelligence Scale to small groups of university students as reported by Caldwell (I9I9) in his review of the earliest Literature, no further progress with intelligence testing as a predictive devise was made until the appearance of the Army Alpha Tests and the Thorndike Scales in I9I6.

During the five years subsequent to the appearance of the Thorndike Scales in America there was an increase in the publication of studies reporting correlational research establishing relationships between intelligence test scores and examination performance, used as a criterion of achievement.

Toops (I926) collected a bibliography of four hundred research report titles covering the period from I9I6-24, pointing out that no less than one in three of the studies carried out reached publication. This fact demonstrates the upsurge in interest using intelligence tests as an index of ability and the belief of its importance as a factor in learning.

McPhail and Bernard (I943); Crawford and Burnham (I946); Edgerton (I930); Segeo (I934)Wagner (I932) all published summaries of research on intelligence as a variable of achievement prior to I950. The studies are additional evidence of the interest in intelligence testing and academic achievement and show that the interest was sustained until the I950's.

The most usual method of estimating the usefulness of intelligence quotient as a predictor of performance was to blanket test all new entrants to the first year at university and to correlate the test scores obtained with examination performance at the end of the first year. The Literature reports a trend towards a medium range correlation coefficient of around 0.3 to 0.7. The mean is reported (Crawford and Burnham, 1946) to be 0.53 which is no indication of I.Q. being an absolute predictor. The figure could be attributed to a spurious result caused by unrepresentative test materials or unreliable testing procedures and analysis.

Derfflinger (1943) suggests that statistical analysis and the sampling techniques used in the early studies is incompetent. He specifically refers to the fact that sample populations are often baised and that unsuitable test norms are frequently used in the early work.

Dale (1954) supports the criticism of unsuitable test material and inappropriate norms being used in the early work. He observes that choice of test is a crucial aspect of any study's reliability and validity when interpreting research findings. He uses the example of verbal as opposed to non verbal tests of intelligence to predict learning performance, the scores from which relate differently to achievement in Arts and in Science Faculties.

Specifically, Dale (1954) finds that whereas verbal tests show a good predictive validity for selecting students likely to do well in Arts courses, and a reasonable predictive validity for those in Science courses, non verbal tests have only a moderate relationship with performance in Science courses and non with Arts courses.

Eysenck (1947) also supports the criticism that early studies have methodological problems of reliability. He makes two points in a short Journal article concerning this. Firstly, he points out that some published work shows incompetent statistical analysis, and secondly, he says that criteria of learning are badly defined and often subjectively assessed.

Eysenck considers this latter point to exist in a context of enormous problems concerning the definition of criteria as a general rule. He writes (Eysenck, 1947, p. 23) that :

> *"The predictive value of a test is probably more depressed by the unreliability of the predictive criterion than by the unreliability of the test itself. Certainly the unreliability of the test is measurable and can be remedied while the unreliability of the criterion is difficult to measure and almost impossible to remedy."*

There seems to be little published data on the unreliability of the examination as criterion of learning used in higher education research. A fuller comment appears in later discussion but mention is made here of a finding by Hartog and Rhodes (1935) for the *International Institute of Examinations Board* which states that reliabilities of 0.8 will not be surpassed, if ever reached, by finals degree examinations.

There is evidence in the Literature for higher correlations to exist when examinations take the form of objective tests. The similarity of the format undoubtedly affects this. Recent studies (Beard, I980) have supported the point of view that the format of the test used to measure intelligence affects the degree of relationship found between test scores and subsequent examination performance. Beard found that graduates in mathematics and the physical sciences excel in perceptual tests of intelligence like Raven's Progressive Matrices. In one of her samples at Oxford, she found that these students tended to get mean scores of 63 out of a possible 65 but that Arts and Social Sciences students tended to get lower scores. In fact, Beard mentions that two of the Arts students who went on to obtain first class honours in English and in Philosophy, had scores of 28 and 33 respectively on the Progressive Matrices.

One early study which falls foul of some major criticisms regarding biased samples is that of Traxler (I940). He selected a sample of sixty nine thousand college students and tested their intelligence to arrive at a mean I.Q. of II7 with a standard deviation of I2. The statistics he arrived at suggest that twenty five per cent of students in the total sample have I.Q.'s higher that II7, with twenty five per cent having I.Q.'s lower than IOI. However, in some of the three hundred and twenty three colleges used for the sample population the student mean I.Q. hardly differed from that of a normal population while for others it was higher than I3O.

It is probably the case that some American colleges serve a local catchment and use locally agreed norms in their entrance requirements and evaluation procedures. In other words, a lack of uniformity between the colleges distorts the sample and so biases the results. Another example of bias exists in the British research of Burt (1943) conducted in British universities during the years 1939- 40.

Burt found that only 1.52 percent of all eighteen olds in Britain whose birthdays fell between the years 1939 and 1940 had been admitted to universities. An assumption he made was that if only the most intelligent secured university entrance the borderline I.Q. separating the students as a group would have been about 135.He writes (1943, p. 97) that :

> "*A simple calculation shows that about forty percent of those whose abilities are of university standard are failing to reach the university; and presumably an equal number from the fee paying classes receive a university education to which their abilities would scarcely entitle them.*"

It is more probably the case that Burt's figure of 135 is a mean I.Q. rather than a borderline one. The wrong assumptions accepted in the 1940's illustrate how biased results come about.

Some studies in the Literature examine the relationship existing between I.Q. and associated variables in student populations. An early systematic study is that of May (1924) at the University of Syracuse.May established that students with above the mean I.Q.'s were more likely to get less than the mean examination mark.These students, he argued, are likely to show lack of application which results in the depressed performance.

May found that combining an estimate of number of hours studied with measured intelligence scores improved prediction of achievement.

Gibbons and Savage (1965) confirmed this in their study at the university of Newcastle-upon-Tyne. They establish a rank order of associated factors which suggest the priority of measured intelligence followed by strength of motivation.

Although Gibbons and Savage found the relationship between measured intelligence and examination performance to be nonsignificant, that between study habits and examination performance was significant. The correlation coefficient established by the Study between extraversion and performance was also significant.

Gibbons and Savage (1965) suggest that I.Q. does not have high predictive value, at least not in a population that is relatively homogeneous in ability. Hudson (1964) had previously published similar findings. He examined the relationship between styles of thinking and achievement and observed that twenty four percent of open scholarship winners in the sample he chose had I.Q.'s below the thirtieth percentile. He suggests that the scholarship students, who represent the academic highfliers, are distinguished not so much by high I.Q.'s but a tendency to work hard and a breadth of interests which presuppose good organisational habits.

Hudson cites an illustrative case study to support his suggestion. The case study is a nineteen year old physicist whose I.Q. is lower than that obtained by eighty percent of his class but whose achievements are superior. Hudson additionally makes reference to a brilliant mathematician whose measured ability is only slightly above the class mean I.Q. but who excelled in academic achievement.

A conclusion to be drawn from reviewing these studies is that high levels of measured intelligence are poor predictors of academic achievement. Many students with high ability will succeed but many will not and this latter group will characteristically have ineffective study habits like inadequate examination techniques, poor organisational ability and lower motivational strength.

It does however seem to be the case that dull students will more often fail regardless of effort or appropriate techniques. Within this group variance in academic achievement is small and factors other than ability are less important. Within the group of students classified as bright, the variance in academic achievement is greater and other factors matter more importantly.

Summarising the results concerning the relationship between study habits, ability as measured intelligence and examination performance, it is established that moderately significant relationships can be expected. As prediction becomes more analytic the selection of the inventory used to describe study habits and the criterion identified to evaluate learning, would seem to become increasingly important.

Summary

1. Ability is defined as previous academic performance measured as A level points or as measured intelligence.

2. The traditional view is that intelligence is a distinguishing characteristic of good students.

3. The earliest research to study the relationship between I.Q. and examination performance failed to establish significant relationships (May, 1924). This can be explained as a tendancy for high ability students to pursue a tendancy to least effort.

4. In other words, high I.Q. students do not fulfil their potential through lack of application to studying. Students of lower measured ability can compensate by working longer hours.

5. One study (Gibbons and Savage, 1965) suggests that combining I.Q. with number of hours spent studying is a better predictor than I.Q. alone.

6. The suggestion is that the factors associated with achievement are complex but that ability factors are high in the rank order.

7. It is probably the case that high levels of I.Q. are poor forecasts of success as many high I.Q. students will fail as well as many will succeed. Low level ability students will tend to do badly despite the appropriateness or otherwise of their habits.

4.I.2 Ability defined as A Levels

Decisions to accept students into universities and polytechnics are made largely on the basis of ability measured as A level points. The widespread use of performance measures in the G.C.E. examinations has prompted considerable research into the predictive validity of A levels for subsequent academic achievement.

Some early studies (Petch, I96I, 1963; Choppin et al, 1972, 1973, 1976; Bagg, 1970; Christie and Mills, 1973; Himmelweit, 1963) have established low to moderate associations between A levels and later degree classifications.

The correlation coefficients established by Petch (I96I) fall within the range of 0.I to 0.4. Other studies tend to broadly confirm these figures. Gibbons and Savage (1965) establish a range of coefficients from 0.0 to 0.7; Choppin et al, in an N.F.E.R. sponsored study found correlation coefficients between mean A level points and degree classifications to be 0.42 in engineering faculties and 0.I9 in Arts faculties with an overall mean correlation of 0.28; Ramsden and Entwistle (I98I) report the most recent correlation coefficients which they establish to be 0.24 for Science faculty courses and 0.I0 for Social Sciences faculty courses. The discrepancy is presumably due to the fact that some A level subjects are more similar in kind to the courses taken at university than are others, especially so in the Arts faculty courses.

Himmelweit (I963) had observed that although the level of significance between the A level predictors and subsequent degree performance is low, the absence of better predictors has resulted in their popularity. Austwick (I958) writing in the *University Quarterly, vol. xv,* about the use of A levels in selection decisions comfirms the nature of their relationship with subsequent performance being low but significant in the sample observed at Sheffield University during the years I954 to 57.

A similar supportive publication from the same period is that of Richards and Wilson (I959) which established relationships to exist between A levels and degree classifications for graduates of Cardiff University. Additionally there is the work of Forster (I959) which examined the relationship between composite A level marks for entrants to the Arts Sciences and Medical faculties at Queen's University, Belfast, during the years I946 to I949. He established that high marks at A level tend to be associated with good overall academic performance at degree level.

Forster (I959) additionally found that performance at A level in certain subjects led to closer relationships with performance at degree level The important feature seems to be that content similarity between school and university subjects leads to closer similarity in standard of performance. He writes (I959, p. 28I) :

"Except in Latin, the main leaving certificate mark gained in a subject by students who took honours in that subject was higher than the mean of any of the other groups of subjects."

This observation has support from an earlier study undertaken by the

Scottish Council for Research in Education (I936). This Study reports that students entering Arts and Science faculties in Scottish universities in the academic year of I928 had the closest relationship between A level and degree performance when the degree course was single honours and the same subject as that taken for A level.

Ramsden and Entwistle (I98I) support this early evidence with their finding that correlation coefficients between A level and degree examination performance vary according to faculty membership which represents the discrepancy or similarity in subject content at both levels.

The assumption is that A levels serving as prerequisites for science degrees have more in common with the science subjects than have arts A levels for the Arts subjects. Arts and Social Sciences courses are less specific in their entry requirements concerning type of subjects taken at A level. For the one group of students, university becomes an extension of school learning experiences while for the other it can become a new learning experience.

Furneaux (I962, p. 68) writes that :

"The evidence most strongly suggests that the marks gained in a particular subject at A level are not necessarily of value as a prediction of success in that same subject at degree level."

Dale (I954) writes that :

"The correlation is weaker in the Arts than the Sciences and within the Arts group of subjects, least weak in foreign languages."

Nicholson and Galambos (1960) support this when they say that only A level subjects relevant to subsequent university courses have a predictive value above the level of chance.

Kelsall (1963), in a review of the Literature supporting a relationship between A levels and later academic achievement, points out that the relatively restricted range of intelligence existing for students at university generates an inevitable relationship. He further believes that relationships which are established might be spurious and he refers to a classic study by Hartog and Rhodes (1935) to make the following points.

Firstly, it is claimed that wide variations in both the marking of G.C.E. scripts and degree examination answers might cause different correlation coefficients to be established by research studies. This leads to lack of consensus regarding the actual significance of A levels for selection decisions.

Secondly, the issue of the appropriateness of A level subjects in selection decision making processes has never been challenged. Hartog and Rhodes (1935) suggest that a case could be made for disputing the relevance of A levels as ability measures An implication is that variables other than those skills needed for successful performance at secondary school level are needed for higher education.

It is worth considering here that A levels serve functions other than that of university selection and they are not specific tests of university suitability. As such, a precise correspondance between performance at both levels should not be expected.

Other considerations concerning the variability between correlation coefficients arise. It might be the case, for example, that special factors external to the student inhibit or help learning performance at one level but not the other. Examples of the kinds of external factors that could occur are those of expert coaching or expert teaching at A level, both of which would affect performance.

Additionally, there might be special factors identified as social or financial which could affect performance at the one level and not the other. Elton (I968) describes a special factor called the idiosyncracy of the university or polytechnic which can affect degree and A level relationships.

Elton's method was to obtain data on students pursuing physics courses in nine British universities. He found that A levels gained by first year students in the different universities corresponded to a pecking order in the selection of places by students with high A level points. Elton also found that this same pecking order led to variability in the percentage of student dropout during the first year.

The universities varied from having a dropout rate of nine percent to thirty eight percent. The better the entry A levels of the students then the higher the qualifications of students unable to stay the course. It is not always the case that the higher A level points predict a greater likelihood of persisting with the first year. Specifically, Elton found that a student with an 'A' grade in physics is more likely to get a degree than a student with a lower grade but a student with an 'E' grade does not necessarily do worse than students with grades up to a 'B'.

Elton found that three universities required identical A level points for entry but that they varied in their pass rate percentages at the end of the first year. The first university had a forty two per cent pass rate, the second had a thirty eight percent, and the third had a seventy two percent pass rate. This he believes is evidence for an idiosyncracy of the university itself as an influential factor of academic achievement.

Himmelweit (1963) suggests another kind of external factor affecting the relationship between A level and degree examination performance. He identifies a measurable difference between the degree examination performances of students whose A levels are sat under separate Examinations Boards.

In the Study, Himmelweit found that students sitting the London Examinations Board G.C.E. papers tended to do better in their subsequent degree examinations than did other students whose G.C.E. examinations were sat under different Boards. For example, those who took A levels under the Oxford Examinations Board, or the Oxford and Cambridge Examinations Board, did less well in the degree examinations. Himmelweit (I963, p. 9I) comments on these findings :

"The tidy rule so often rigorously applied to accept no one with A level marks below a given level is a fallacy."

Himmelweit goes on to suggest that A level performance is influenced by the quality of teaching and the format of the examination papers as well as the Examinations Board under which the papers are sat. For these reasons he sees A levels as poor indices of ability.

Some studies in the Literature have considered the relationship between O levels and degree examination performance. Christopherson (I962) examined the subsequent classifications obtained by engineering students with certain O level grades. He found a positive correlation between both the number of subjects gained at O level and the grades achieved and subsequent degree classifications.

Himmelweit (I963) partly supports this finding but with qualification. He establishes that relationships between O levels and performance at university examinations varies according to the group of students identified. For example, in economics and sociology degree subjects, the classification obtained holds no association whatsoever with academic performance at O level.

Himmelweit does establish a correlation between O level performance and degree classification in Law as a single honours subject. This relationship is moderate only. In accounting for the relationship, though slight, Himmelweit speculates that the similarity of certain skills needed for both types of examinations (he refers to good memory capacity) might be a common denominator.

Interestingly enough, Himmelweit does establish that the time when O levels are taken matters. Those students, in his Study, who had taken O levels later than is normal did less well at university. This might reflect the fact that students who take O levels later than normal are either resitting them or are reentering education as mature students with all the attendant problems this entails.

In conclusion, it seems to be the case that G.C.E. O and A levels cannot be relied upon as accurate indices of ability nor as reliable forecasters of subsequent academic achievement. This is especially true of those degree courses for which the G.C.E. subjects have less relevance in terms of content. Success at secondary school level means only that a student has a potential to achieve at university or polytechnic level, and not that a student will achieve.

In this sense, G.C.E. performance serves a selective but not a prognostic function. Selecting a group of students likely to succeed is not the same thing as selecting students who will succeed. It is probably the case that homogeneity of ability of students with prerequisite points at A level makes subsequent failure accountable to personal and contextual factors rather than ability.

Summary

1. The early studies establish a moderate significant relationship between A level and degree examinations (Petch, 1961, 1963; Choppin et al, 1972; Christie and Mills, 1973).

2. The closest relationship seems to occur between A level and degree examination performance in subjects which are similar in kind. This seems to have some dependence on Faculty membership (Ramsden and Entwistle, 1981).

3. One study (Kelsall, 1963) suggests the inevitability of a relationship given the restricted intellectual range of students in higher education.

4. Lack of consensus in the Literature concerning the relationship might be due to variability in the marking of A level scripts (Hartog and Rhodes, 1935); different standards between Examinations Boards (Himmelweit, 1963); and the idiosyncracy of the universities themselves (Elton, 1968).

5. There is evidence of some relationship between O levels and later academic achievement at university (Christopherson, 1962) but the correlation is small and restricted to subjects like Law.

6. It is probably the case that A levels serve a selective and not a prognostic function.

4.2 Study Habits and Dispositional Variables

> *"I have never let my schooling interfere with my education."*
> *(Mark Twain)*

The research Literature supports two main propositions concerning the relationship between personality and learning achievement. The first is that personality characteristics can be shown to have a positive significant association with academic achievement. The second is that differences in personality characteristics can be shown to be associated with different approaches to studying.

There is however, a lack of agreement in the Literature about the most appropriate use of terms with which to identify those characteristics which seem to be important. In the search for a satisfactory definition of personality, psychologists have identified patterns of development showing similarities and differences. As Kluckhohn (I953, p. 53) writes :

"Every man is in certain respects (a) like all men, (b) like some other men, and, (c) like no other man."

Allport (I963, p. 28) suggests that the traits used to describe the similarities and differences between individuals are at best hypothetical constructs with no universally agreed consensus about their existence or importance for description. He attaches importance to those traits which are commonly found and which can be measured because of their relative consistency. He writes (Allport, 1963 p. 343) that :

"The scientific evidence for the existence of a trait always comes from demonstrating, by some acceptable method, the consistency of a person's behaviour."

Entwistle (1983) has commented on the degree to which traits can be demonstrably consistent. He says that if traits can be identified and measured and shown to be consistently related to aspects of behaviour then their utility as constructs is established. The problem becomes one of deciding which traits have most utility.

Traits identified in the Literature as being of utility in the examination of learning achievement and study habits are *extraversion* and *neuroticism*.

4.2.1 Extraversion and neuroticism

Eysenck (1965) uses a statistical procedure of factor analysis to establish the consistency of personality traits, the patterning together of which he calls *extraversion or introversion; neuroticism or stability*. In 1969 he added a *psychoticism* dimension which is an asocial or antisocial morality but which does not feature in the research Literature prior to 1969.

The origins of extraversion are said to be in biological bases with individuals differing in the extent to which cortical arousal and activity in the hypothalmus occurs. Introverts typically show greater cortical arousal than extraverts and neurotics show higher levels of hypothalmic activity than they do stability.

Jung (I938) had first identified extraversion and neuroticism as individual difference variables. He saw the psychological type of extravert as tending towards an outward looking view of life and with a preference for an objective factual world. The introvert tends towards an inward looking view and value judgements reflecting an idealist world. He writes (Jung, I938, p. 48I) that :

"(The extravert is characterised by) the purely empirical heaping together of facts (which) paralyses thought and smothers their meaning ... introvert thinking shows a dangerous tendancy to coerce facts into the shape of its image."

Jung's concept of types is that they classify particular ways of thinking. Eysenck's originality lies in the conception of them being classifications of how individuals behave.

For example, Eysenck suggests a relationship exists between types of personality and learning behaviours. Introverts, he claims, are more easily conditioned than extraverts and they possess greater powers of concentration and retentative memory. The implication is that introverts might have superior learning potential. He writes (Eysenck, I970, p. 59) :

"(Extraverts) like parties, have many friends, needs to have people to talk to, and do not like studying by themselves ... generally impulsive individuals."

And that, an Introvert is, *"Fond of books rather than people; is reserved and distant ... tends to plan ahead and distrusts the impulse of the moment."*

There is some evidence to suggest that the relationship between neuroticism and learning is an inverted "U" shape (Entwistle, I983; Furneaux, I962). Common sense dictates that too much anxiety, as well as too little, inhibits students' academic progress. Saranson (I975, p. I78) reports evidence to show that anxiety influences students' performance in examinations :

"Worry is an attentionally demanding activity ...... The time spent worrying about one's level of adequacy can be expected to interfere with task performance."

Robertson and Molloy (I982) found, in their sample of postgraduate students at Aston University, that a linear pattern existed for neuroticism and learning with low N students obtaining higher performance ratings than more anxious postgraduate students.

A study by Eysenck and Cookson (I969) had found the opposite to be the case in their sample of primary school children. However, Entwistle and Welsh (I969) failed to replicate their results in the same age group. Additionally, they found that in a sub group, identified as high IQ childrem, negative correlations between neuroticism and exam performance.

Entwistle and Welsh (I969) also established that negative correlations exist between extraversion and achievement in both the high ability and the general sample. This applies also to females as a sub group in both the high ability and general sample.

conclusion of the Study is that introverts of both moderate and high ability levels will do better academically and that introverts who are stable as opposed to neurotic, will do well.

An overall point to emerge from the Study is that ability factors appear to interact with personality traits to produce a combined effect on academic achievement. The controversy is about which traits in combination with ability produce the most advantageous effects.

A study by Gibbons and Savage (I965) had earlier found that no significant relationship seems to hold between extraversion and examination performance, giving support to the Entwistle and Welsh (I969) findings. The earlier Study had measured the effects of extraversion on examination performance in a sample of undergraduates. A conclusion of the Study was that perhaps there is an age relevance connected with any relationship between the two variables. This would have the advantage of accounting for the discrepant results found with primary school age children (Eysenck and Cookson, I969).

American Literature is not supportive of this and in fact generally tends to claim a superiority for extraversion and especially extraversion and stability in learning achievement (Lavin, I965). Entwistle and Wilson (I977), in their review of the British evidence, suggest that a good honours level performance tends to be associated with stability and that there is supportive evidence for the added importance of introversion.

Furneaux (I962) and Kelvin (I965) had independently established the association of neuroticism and introversion with superior academic performance. A study by Wankowski (I973) lends support to the general picture emerging from the British evidence. He found that high neuroticism and extraversion together tend to inhibit learning performance. Stability and introversion tend, on the other hand, to produce superior performance.

The emphasis on introversion is given added perspective by a study by Warburton (I968) who found that the degree of introversion important for academic success has a tendancy to be associated with the particular subject pursued.

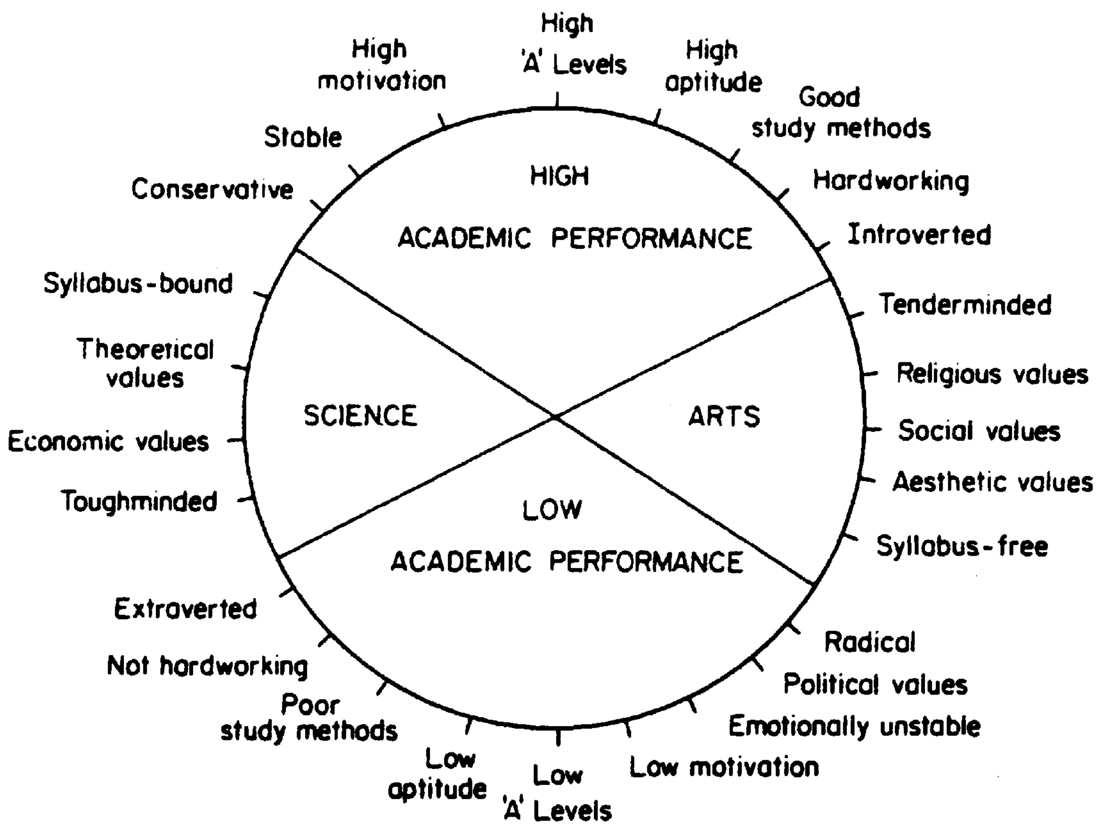
Entwistle and Brennan (I97I) confirm this with their observation that neurotic introverts make good engineers but stable introverts made better pure scientists. Similarly, it is claimed that neurotic introverts have a tendancy to be good at languages but stable introverts do better at history. Interestingly enough, Wankowski (I973) found that the failure rate of stable introverts on physical sciences courses is one in thirty eight compared with one in seven for neurotic introverts on the same type of courses.

Entwistle and Wilson (I977, p. I48) describe the relationship between extraversion or introversion and type of course pursued as identified in their study. The results are illustrated in Fig. I. They extended the focus of their enquiry to examine what relationship, if any, exists between extraversion, stability and study habits.

Some previously published research had been done by Gibbons and Savage (I965) which established that extraversion tends to be

Fig. I Relationship Between Students' Characteristics, Faculty Membership And Level Of Academic Performance

(Adapted from Entwistle and Wilson, 1977, and cite, Entwistle, 1983, p. 97)



slightly but positively associated with certain study habits, in particular with the amount of time spent studying. Neuroticism, alternatively, tended to be negatively correlated with study habits.

This latter finding is perhaps unpredictable. It might be the case that high levels of anxiety are inhibiting and not motivating as regards study behaviours. Entwistle and Wilson (1977) certainly found evidence of an association between high motivation and neuroticism in low to moderately high study habits scores but an association between high study habits scores and stable introversion.

Entwistle and Wilson (1977) also examined the relationship between study habits and examination performance in first year students at the University of Aberdeen and a College of Education. It was established that motivation and study habits are both significantly associated with examination marks. One study habit in particular emerges as meriting special emphasis and this is the number of hours spent studying which surprisingly had a non significant association.

The Study concludes that good students are superior for reasons other than that of working long hours. It is suggested that introvert students are more successful academically than extraverts and that the degree of neuroticism or stability has less importance than that of introversion.

However, the Study also establishes that stable introverts tend to have *better* study habits. It appears that introversion is the key factor in the general superiority of students but that stability might bear a relationship with superior study habits. An identikit of an *average successful student* emerges from these findings. This ideal student plans work with good organisational skill, is conscientious in recognising the importance of good conditions for studying in, has some obsessionality and independence and self confidence to do things well.

The data suggests that those good students who approximate to this ideal type have weak spots in that not all the criteria are met with in every case. Rarely, however, did the Study find that good students have poor study habits, high extraversion or high neuroticism.

Some evidence does exist for there being a possibility that high neuroticism is related to high achievement in especially able students. However, it is concluded by the Study that whilst this sometimes is the case the number of times it occurs is small and that neurotics will not typically do well academically as a group.

Haggard (I957) had earlier made a similar observation when he found that neuroticism has a debilitating effect on academic achievement. He observed that some highly intelligent students can utilise neuroticism by increasing their drive for success but that this is rare. A study by Robyak and Downey (I978) supports the findings that academic performance is a function of personality and study habits.

They studied the effect of good study habits, measured by the SSHA, in a sample of undergraduates at Kansas State University and found that there is a significant relationship with examination success. They suggest that students with no prior history of underachievement can be identified as possible casualties on the basis of their study habits profiles and personality scores.

The main contributing factor to underachievement is suggested to be poor study habits knowledge but some high achievers in the sample were found to have poor study habits which Robyak and Downey (I978) interpret as evidence for the role of an additional variable, namely, personality.

Contemporary British research has not confirmed this observation. Brown and Nelson (I983) have found that highly anxious students differ from low level anxiety students on traditional cognitive and somatic tests of anxiety but reveal little or no differences in their study habits.

The suggestion is that high achievers, regardless of anxiety level, score higher on measures of study habits than underachievers. The skills identified as being important are specifically those of organisation, textbook reading and examination techniques.

Brown and Nelson (I983) review the early Literature which presumed a relationship to exist between anxiety as a personality trait and academic performance (Finger and Galassi, I977; Galassi, Frierson and Sharer, 198I; Meichenbaum and Butler, 1980) but emphasise that their Study suggests the link to be weaker than presumed. The implication is that treating all anxious students alike in counselling contexts and in predicting a low achievement level, is unfounded.

The Study further implies that knowledge about effective study habits is not strongly associated with anxiety about achievement but that high anxiety can tend towards unrealistic expectations concerning adequate examination preparation (Brown and Nelson, 1983, p. 367) :

> *"Test anxious students tend to have unrealistic expectations about adequate preparation and establish study goals that are impossible to attain."*

This is possible what Robyak and Downey (1978) intend when they describe the personality type of introvert with its characteristic trait of anxiety, as a cognitive style with a predisposing approach to studying and learning. Quoting from Jung (1938), they describe an introvert as conferring, *"A disposition to focus attention on the inner world of concepts and ideas."* They go on to suggest that :

> *"An introvert's best work is accomplished inside the head by reaching understandings through reflection. With this orientation it could be argued that introverts do not need to use study skills in order to acquire the concepts and ideas of their academic classes."*

The cognitive style they describe is of reflectivity. Others have identified reflectivity as a cognitive style (Kagan et al, 1964) and although introversion may be associated with this approach to learning it seems a naivety to confuse a personality type with a cognitive style which, using Messick's (1976) criteria, encompasses personality within it.

Overall, it seems to be the case that the Literature establishes an interactive effect of personality, study habits and ability on learning achievement. Non underachievers, for example, can be shown to be doing well academically because of predisposing personality traits in the absence of effective study habits and underachievers can be shown to be underachieving because of inadequate study habits knowledge and a tendancy towards extraversion.

The suggestion for further study emerging from this is that personality variables are important considerations in any discussion on the relationship of study habits to academic achievement.

Summary

1. The Literature suggests that personality factors relate both to learning achievement and to study habits.

2. Studies (Entwistle, 1983; Brown, 1970; Furneaux, 1982) have independently established a relationship between neuroticism and achievement that is U shaped, suggesting that too much and too little anxiety inhibits performance.

3. Studies (Eysenck and Cookson, 1969) have established an association between extraversion and learning in primary school age children.

4. Other studies (Entwistle and Welsh, 1969) do not support this in older aged students and in sub groups identified as high ability. This might be an indication of a developmental trend.

5. There is support (Gibbons and Savage, 1965; Entwistle and Wilson, 1969) for introverts to do better than extraverts at university and for stable introverts to do especially well.

6. Studies (Furneaux, 1962) confirm the importance of introversion but disagree about the importance of stability.

7. One study (Warburton, 1968) suggests that the effects of introversion might be selective and associated with certain subjects only.

8. It is probably the case that introversion is a key factor in the academic superiority of certain students but also that stability has some relationship with superiority of study habits.

9. The conclusion is that personality traits and study habits interact to produce a concomitant effect on learning achievement.

4.2.2 Academic Self Concept

"I am not an underachiever. My teacher is an overexpector."
(Child's response to a School Report)

There is evidence in the Literature of an upsurge of interest in the effects of self concept on learning performance (Covington and Beery, I976; Wells and Marwell, I976; Bandura, I980).

The concept of *self* is central to the work of Cooley (I902), Mead (I934) and most recently, Ruth Wylie (I974). The Mead-Cooley approach to understanding self concept is to view role behaviours as influenced by self perceptions. An individual's actions, and these include mental actions or thought, depend on the way in which the individual perceieves himself. This self perception comes about through projecting onself into the minds of others by a process of what Mead (I934) calls *taking the role of the other* and imagining what others would think of him.

Cooley (I902) believed that the self image which results consists of imagination about appearance to others. It involves some kind of self feeling about how others judge this appearance.

In this way a conception of self comes about which influences the development of cognitive structures because attitudes towards self are influenced by judgements about how self is perceived.
Chapman et al (I984, p. 284) write :

"Research suggests that self perceptions are important mediational

influences which define for individuals the nature of their relationships with other people, the types of behaviours and tasks in which they will engage ... and in turn, how individuals will perceive themselves."

An example might be that of a lecturer who thinks of himself as a disciplinarian and an authoritarian person. He is likely to be very different in a teaching role than a lecturer who sees himself as a friend to every student and a democratic person. Similarly, a students who perceives himself as *good* will tend to play the role of a good student. The ideal role performance of good students is well defined as that of high achievement. Not all students are expected by their lecturers to achieve the ideal since it is widely thought that there is a range in the achievement levels of students.

This expectation is realised in the sorting out of students into *able* and *less able* categories by lecturers and peer group alike. These evaluations by Mead's *significant others* provide the *looking glass* by which the students perceive themselves.

There is evidence to suggest that students with high self image not only set higher goals for themselves but that they also perform at higher levels (Brookover, 1965). Low self image produces expectations of poor performance which is realised. In this way, self perceptions of competence and controllability can be viewed as causal agents.

An example illustrating this is that of Alec, a street corner gang member, studied by Whyte (1955). Although a skilled bowler, Alec's performance deteriorates when bowling with a group. His peers expect him to perform badly and he does.

Research evidence on the effects of academic self concept on achievement in school contexts is presented by Rosenthal and Jacobson (1968). This classic study examines the influence of teacher expectations on self concept and subsequent achievement in preschool age children. Rosenthal had found that rats became brighter when expected to by their handlers and he wondered whether pupils similarly showed more intelligent behaviours when expected to.

Rosenthal and Jacobson selected a preschool in a low socioeconomic area of San Fransisco and chose three classes grouped according to ability as their sample population. About twenty percent of the children from every class were randomly selected as an experimental group and the names of these children were given to class teachers with the communication that these were high scorers on ability tests.

The teachers were additionally told that the children would predictably show remarkable gains academically over the next eighteen months whilst in their care. The forecast had no evidence base, the only difference between these and the other children being in the minds of the teachers. Meighan (1981, p. 125) in describing the results of the Study reports that :

"At the end of the school year, all the children were again given the same IQ test. In the school as a whole, the children who had been described as 'bloomers' showed only a slightly greater gain in verbal

IQ than their classmates. However, in total IQ the experimental group gained four points more on the average than their classmates did, and in reasoning IQ the average gain was seven points more."

Reviews of the Study have not always been supportive of the results (Snow, 1969; Claiborn, 1969). Criticisms are made of both the methodology and the substantive findings which have not been easy to replicate (Claiborn, 1969). Meighan (1981, p. 125) suggests that the importance of the Study lies in its pioneering function as an investigation into teacher expectations and academic self concept. Its importance is illustrated by the fact that by 1973, two hundred and forty two replica studies had been completed with eighty four of them demonstrating a positive effect of teacher expectation.

The effects of self concept on motivation leading to a self fulfilling prophecy is supported by recent research (Chapman et al, 1984). This Study suggests that learners' self concepts are an important factor of achievement although the causal direction is not understood. It is further suggested that although many investigations have examined the relationship between *general* self concept and learning (Purkey, 1970; Uguroglu and Walburg, 1979; Revicki, 1982), few of the investigations in the Literature have focused on *academic* self concept.

It has been demonstrated (Shavelson et al, 1976) that the more closely self concept is linked with specific situations the closer is the relationship between self concept and behaviours. So, academic self concept should have a stronger link with achievement than has general self concept. Some empirical data is available to support this hypothesis (Boersma and Chapman, 1978; Burns, 1982).

Some of the research Literature concentrates on the processes by which expectations determining academic self concept come about. The work of Good and Brophy (1972) supports the notion of teacher expectations producing variable academic performances. They focus on the differential expectations of teachers for children in their classes. It was established that teachers spend proportionately different amount of time with pupils whom they perceive as meriting it and that the quality as well as the quantity of interaction varies.

Fuchs (1968) has described how *interpretive schemes* of newly qualified teachers are influenced by those of established teachers Garwood and McDavid (1975) show how first names are perceived in stereotype ways by teachers who attribute personality and ability characteristics to them. Garwood (1976) examines the effects of teacher ratings of Christian names and finds evidence to support the hypothesis that males with desirable names have higher academic self concepts and achievement levels than males with names rated as undesirable.

This latter result was earlier put forward as an hypothesis by Harrari and McDavid (1973) who believed that written work submitted under desirable names would receive higher marks than the same work submitted with an undesirable name.

Palardy (1969) found that sex typing effects expectations and suggests that a self fulfilling prophecy occurs in the reading performance of boys versus girls. Harvey and Slain (I976) used photographs to show that lower social class children receive lower ratings from teachers and that this effect is most marked when the children are also black. Most of the studies suggest how expectations are internalised by the children and that non verbal communication is a means to this internalisation. Meighan (I98I, p. I2I) suggests that these effects of expectations can start from false perceptions :

> *"It is because most people are prepared to make inferences on the basis of the most slender evidence that so many of our initial inferences about other people are misleading and sometimes completely false ... an elderly teacher once boxed the ears of a student teacher on his first day of teaching practice for running along a corridor. He had inferred from the student's age that he must be a sixth form pupil."*

There is evidence to suggest that expectations become self reinforcing. That is to say, high status individuals are expected to do well and having done so their self image is reinforced. Brown (I983) suggests that high status might start from perceptions concerning the desirability of students' personalities.

It is suggested that lecturers use personality criteria when identifying ideal students. While rating intellectual ability, lecturers tend to prefer high ability in students with pleasant personalities (Brown, I983). Fishman (I957) had earlier shown how lecturer assessments often reflect the closeness of the resemblance between students' personalities and their lecturer's.

There is a suggestion in the Literature that problems exist concerning the stability of academic self image (Wankowski, I973).

Wankowski (1973) found, as Brown (1983) does, that a poor self image leads to poor performance which leads to a reinforced poor self image. He suggests that the abrupt change from school to university acts as a depressant on academic competence leading to a lowered motivation for studying and to prolonged stress, which Wankowski calls an imaginary *intellectual impotence*.

Lecturers and students, representing models of success, are likely to further increase anxiety levels. An informal remark heard by a lecturer (unpublished notes, Williams, 1983) illustrates this :

"The impression you get when you hear him lecture is that he wants us to know how much he knows and how little we know."

Miller and Parlett (1974) found evidence of students' lowered self concept being caused by exposure to models of success. They identify differences between students of high and low academic self concept in terms of a susceptibility to pick up *cues* from significant people, and having picked up the cues, to acting upon them.

The Study is discussed in later pages but it is relevant here to illustrate how self concept is affected by these successful models. Bligh (1972) explains poor self confidence of many first year students as stemming from an inability to meet the adjustment demands imposed by new requirements of learning.

Bligh calls these problems a *Cynthia syndrome* in honour of an early case study at the University of London in 1971. The syndrome labels what Bligh sees as an important area of learning disability. Problems of adjusting to university requirements was previously studied by The University Grants Committee which published a report on the main findings and recommendations.

The Report (I968) states that there are measurable differences between students who successfully complete their degree courses and those who do not and that these relate to the recency of the transition.

Students who unsuccessfully complete their first year by dropping out in terms later than the first one when difficulties tend to be non course related, often feel unable to cope with the academic demands of their courses. This low confidence has counselling potential as mentioned in early pages of the present Study.

Cohen (I972) examines what the Report described as course related problems and finds that anxiety generated by feelings of incompetence become inhibiting. Lack of self esteem, irrespective of actual ability, depresses performance.

The suggestion emerging from a consideration of the Literature is that students' self concepts are affected by exposure to successful models and by expectations of lecturers which are communicated in classroom interactions.

Meighan (I98I) shows how this occurs even in the absence of physical interaction. He uses the example of a study made of the behaviour of tutors of the Open University who make inferences about competence on limited evidence (Bull and Stevens, 1976). The Study investigated the effects of handwriting and physical attractiveness on essay marking. An essay was copied in different handwriting and attached to photographs ranging from attractive to unattractive. Considerable variation was found to exist in the marks awarded by the tutors. When marked for style the well presented (typed) essay with an unattractive photograph received highest marks; the same essay written badly and with an attractive female photograph received the lowest marks. For talent, the essay in good handwriting from an attractive female received high marks but the same writing accompanied by an unattractive female photograph received low marks.

When the writer was believed to be male, fewer differences relating to handwriting and physical attractiveness were found to exist for the male tutors. Although these results are not straightforward, the evidence for an effect of expectations on marking was established.

It seems reasonable to think that course work assignments and examinations provide an important part of the *looking glass* by which students appraise their own competences. It seems plausible to view this as a self fulfilling prophecy with depressed performance leading to a continuation of low academic self concept. As Thomas (1917, p. 160) observed :

"If a situation is defined as real, it is real in its consequences."

And as Toby (I957, p. 263) wrote :

"Success accumulates and generates the conditions for further success."

Sometimes there are cases where performance is different from that expected. An explanation offered for this deviancy is that of Coleman (I960, p. 337) who found that scholarship is valued differently by respective universities.

In a situation where achievement is devalued, a capable student might play down his ability in order to avoid being labelled a swot. Hargreaves (I972) has shown the same effect in his participant observer study of *Lumley Secondary Modern School* where achievement is devalued by certain streams and where class members conform to the norm of their group.

There is a suggestion by Coleman that future research should consider the context of the particular social system of an institution in order to get a more complete understanding of self concept and role performance and the effects on achievement and study behaviours.

Summary

I. There is evidence to suggest that high academic self concept is associated with superior academic achievement (Brookover, I965)

2. Academic self concept is influenced by attitudes of lecturers and specifically by their expectations of success (Jacobson and Rosenthal, I968).

3. There is criticism of the effects of teacher expectations and of the importance attached to it (Snow, I969; Claiborn, I969).

4. Factors affecting expectations include stereotypes of class (Brophy, I972); names (Garwood and McDavid, I975); gender (Palardy, I969); race (Harvey and Slain; I976) and these stereotypes can be learned from older teachers (Fuchs, I968).

5. Some evidence exists to suggest that personality variables might be more important than ability in determining expectations (Brown, I983)

6. There are some problems concerning the stability of academic self concept (Wankowski, I973).

7. Exposure to successful academic models can further depress feelings of competence leading to lowered academic self concept and poor motivation for studying (Miller and Parlett, I974).

8. Transition from school to university life can affect this depressed competence further (Bligh, I977).

9. Sometimes deviant cases occur where performance is not what was expected and an account of this is given by Coleman (I960) who suggests that the social organisation of an institution needs investigation as a contributing factor.

4.2.3 Students' Perception Of Learning Requirements

JOHNSON :"I had no idea that I was wrong or irreverent to my tutor."

BOSWELL : "That Sir, was great fortitude of mind."

JOHNSON : "No Sir, stark insensitivity."

(Boswell's Life of Johnson, I728, p. 60)

It has been suggested (Wankowski, I973; Entwistle and Wilson, I977; Miller and Parlett, I974) that poor self image deriving from a perceived inability to successfully adjust to new methods of studying and techniques of teaching leads to underachievement.

Failure to adapt to new conditions of learning might account for a percentage of failures in universities and polytechnics but this is not a widely held popular perception of underachievement (O'Connell I970). Many students report that the transition from school to higher education is not as difficult as might be supposed and that it represents more an extension of old and existing study habits than a learning of new ones.

Informal conversation with students (unpublished notes, Williams, I982) sometimes suggests the need for habitual habits of studying to be modified or adapted to change new requirements but that rarely are habits replaced entirely with new ones. An implication of this is that students with ineffective habits are unlikely to replace them.

Some studies in the Literature suggest that study habits are often ineffective because they lack appropriateness rather than skills. In other words, there is a suggestion that underachievement occurs because students lack precise expectations about what they are required to do.

This is an hypothesis concerning the importance of students' perception of learning role and of the problems for learning resulting from conflict between lecturers' and students' perceptions of student role.

An early study concerned with students' perception of role was done by Heath (1964; 1978) who interviewed students at Princeton University and from typescript data noticed the existence of marked similarities and differences between students' expectations of studying behaviours.

Heath suggests that these expectations determine routes to studying which he variously describes as *non commital, hustling and plunging.* The non committers and the hustlers and the plungers are believed by Heath to be underlined with distinctive personality characteristics. These he discusses are as follows :

"The non committer avoids involvements, he believes that he could do a lot of things if he went all out but this presents risk so he plays safe."

"The hustler has a need for achievement and concrete success and is competitive. He prefers courses that emphasise logic and factual material."

"The plunger has variability in mood and is enthusiastic then uninterested in his work. Frequently misunderstood, he is viewed as a little odd."

Heath believes that these different types achieve differentially.

His results indicate a relationship between these individual differences and academic success and that there is a superiority of noncommitters and plungers over the hustlers.

Methodologically the study has criticism because Heath relies on intuition and hunch in arriving at his conclusions. It seems to have an importance however in being the forerunner of an important study carried out later at Harvard University (Perry, I970).

Perry (I970) adopted an interview technique for his data collection and the interviews were open ended. Questions were typically of the form, *"Why don't you start by telling me what stands out for you about this year?"*. Perry established a conceptual scheme from the responses given to him and he calls this a procedure of *contextual relativistic reasoning* in which to locate student types from the responses made.

This continuum, along which are located student types, has an association with levels of academic performance. Perry suggests that underachievement, for example, is associated with a discrepancy between student and lecturer conceptions of student role. He describes some students who perceive their role to be one of receiving knowledge and who perceive lecturers' role as being about giving *right answers*.

Gibson (I970) conducted a similar study in Britain using a sample of undergraduates pursuing sociology degree courses. She finds that students and staff often have dissimilar notions about knowledge and the nature of knowing. Many students believe theories within the behavioural sciences to be right or wrong and open to disproof.

Gibson quotes from Peters (1958) who had observed that students sometimes look for theories which are logically impossible. She also quotes from Veness (1968) who has written about students using concepts so imprecisely that they could be, *"squeesed into any shape available."*

A study by Ramsden and Entwistle (1982) further establishes the conformity or lack of it existing between student and lecturer perception of student role. They find that students' expectations about their learning role determine the way in which studying is organised. Ramsden and Entwistle call these ways of studying *orientations to academic life* and they describe three main ones.

An orientation to *personal meaning* describes intrinsically motivated students pursuing a subject for its own sake and for the amount of interest and enjoyment it generates. A *reproducing* orientation describes the recall of material under test conditions with little evaluative discussion or evidence of insight. These first two orientations have much in common with the Gothenburg School view concerning *deep* and *surface* levels of processing material described by Fransson (1977) and Svensson (1977).

A third orientation is that of *achievement* which describes an over concern with examination success and little concern with the ideas contained within the material itself.

Ramsden and Entwistle (1982) examine the relationships existing between these ideals and other factors. For example, they suggest that departmental organisational factors determine role perceptions. Specifically, Course Board decisions about assessment procedures and teaching methods define the requirements which students need to internalise in order to meet (Workshop seminar, *"Linking Theory And Practice"*, Oxford Polytechnic, 3.12.80).

Another study looking at the effects of students' perception of study behaviour is that of Cohen and Toomey (1973). The study bears an unacknowledged resemblance to an earlier study by Birney and Taylor (1956).

Cohen and Toomey (1973) use a description of *orientation to university life* to classify student types. They measure these orientations by means of an inventory on attitudes to academic life which they developed. Birney and Taylor in 1956 had previously identified two distinct orientations which they called a *social orientation*, describing an ability to make friends and enjoy oneself, and a *scholastic orientation* describing an intention to do well academically.

The 1956 Study had found no significant differences between the examination performance of socially orientated and scholastically orientated students. The conclusion was that attitude towards university life appears to have no effect on academic achievement.

Cohen and Toomey (1973) do not support the results of the 1956 Study. Their investigation generated evidence for there being five and not two orientations describing students' attitudes towards their work. They additionally suggest that evidence exists to establish a relationship between these orientations and examination performance.

The origins of students' expectations about university and polytechnic life seem to begin at secondary school through media presentation of student image. Cohen and Toomey (1973) believe that in addition to this the first term at university plays a large part in the formation of attitudes towards studying and life at university. They suggest that within this first term one factor stands out as being of prime importance and that is the type of accommodation students find themselves in.

For example, they believe that hostel accommodation is associated with the development of an orientation towards socialising and the formation of attitudes acknowledging an importance for the non academic side of university life. The probability is that the greater availability of social contact afforded by hostels accounts for this but it might well be that it is the socially orientated who chose hostel accommodation in the first place.

The *vocationally* orientated students, on the other hand, are those who perceive university as a means to a vocational end. The goals of these students are good jobs and the status of obtaining a degree. It is the reason why these students are at university.

Another orientation is the *academic* which describes an intrinsic motivation to study for its own sake. Students who perceive their qualifications to be important but not sole goals of learning are described as *socio intellectuals* in their orientation. This describes a perception of university life as a forum for discussion about ideas and a place where changes can be instigated to improve social conditions and life in general.

The last orientation to be identified by Cohen and Toomey (I973) is the *non conformist.* This orientation describes students who perceive university as *fair game* for criticism and debate and who challenge established curriculum and procedure. These students are not necessarily political but they are dissenters believing in the right for participation in curriculum development and in alternatives to prevalent belief systems.

Although Cohen and Toomey (I973) are not primarily interested in the superiority of any one of these orientations, they do suggest a tendancy for the vocational and socio intellectual attitudes to be optimal. They are both concerned specifically with motivational accounts of how the orientations come about and with hypotheses about effects on learning processes.

For example, Cohen and Toomey (I973) discuss how a high committment to studying is associated with academic and vocational orientations. These orientations are similar to ones widely held by lecturers and it is suggested that matching orientations confer self esteem and more positive expectations of success.

It is suggested that lecturers are less satisfied with students whom they identify as having discrepant orientations and that this lowers lecturer expectations and depresses performance.

The analysis of achievement and of study behaviours in terms of constructs of student perception of learning role is supported by other studies in the Literature (Nash, I978; Delamont, I976). Successful students are often described by these studies as those who see what lecturers expect and then strive to match these requirements in conforming to the constraints placed upon them.

A study that specifically examines students ability to discriminate between lecturers' requirements within departments and faculties of a university and the attempt to conform to them is that of Miller and Parlett (I974).

Miller and Parlett (I974) identified students in their first year at Edinburgh University as being unalike in their facility to be aware of implicit requirements held by lecturers which are never explicitly communicated. The Study calls these implicit requirement *cues* and describes *cue consciousness* as an awareness of their existence.

Consciousness of cues is similar to knowledge about hidden curriculum which Meighan (I98I) describes as an important factor in academic success. It is the perception of hints and nuances and emphases concerning the importance of certain things to a lecturer. This could relate to points of view or to procedural priorities like assignment deadlines being flexible or not.

The behaviour of cue conscious students is described as *cue seeking*. Cue seekers are those who act upon implicit requirements and typical behaviours include giving positive feedback in class contact and agreement in emphases within written assignments, and the adoption of an evaluative rather than a descriptive style.

Lack of cue consciousness is described as *cue deafness*. Cue deaf students are unaware of a hidden curriculum and recognise only the legitimate one of timetables, course objectives and examination requirements. These students miss the nuances of teaching learning interactions that Bligh (1972) calls the *unintentional effects*. The prevailing perception of cue deaf students is that effort and thorough revision of notes is all that is needed for good academic results.

Miller and Parlett (1974) discuss in their results section whether any relationship exists between cue seeking behaviours and the degree examination classifications obtained by students. They conclude that cue seekers tend to get upper second class honours whereas cue deaf students tend to get lower seconds and third class honours.

An independent study by Ramsden (1979) gives some support to these results. Ramsden finds evidence of a similar effect of perception of hidden curriculum in a different student sample population.

Ramsden (I979) additionally suggests that cue consciousness might have a variable effect depending on the situation in which it exists. He describes the kind of situation most favourable to the exploitation of cues as being an informal or open learning context.

Most typically, an informal learning context occurs within timetabled seminar or discussion groups.In discussion groups students are exposed to many cues and so have a greater opportunity to exploit them. Departments which have a large number of such discussion periods relative to formal lectures will predictably have a higher number of cue conscious students.

Ramsden (I979) confirms the earlier Literature findings that students' perceptions about learning behaviours and objectives affect their learning approaches and their achievement level. His originality lies in adding the contextual relevance of situations which determine the implicit rules of what he calls *the assessment game* which students play.

Summary

I. Poor self image has been shown to be associated with under-achievement (Wankowski, I973; Entwistle, I977).

2. Some studies suggest that poor self image results from unsuccessful transition from school to higher education (Wankowski, I973).

3. Others suggest that it is those students with poor study habits that make the least successful transitions (O'Connell I970).

4. Study habits might be ineffective because they lack an appropriateness due to students' misperceptions about their study requirements (Heath, I964; I978).

5. Others have confirmed that students role perception is often discrepant with lecturers' perception of student role (Perry, I970; Gibson, I970; Ramsden and Entwistle, I982; Cohen and Toomey, I973; Miller and Parlett, I974).

6. It seems to be the case that aspects of a hidden curriculum are more readily picked up by certain students and that this consciousness has a variable effect on academic achievement, one feature of this being the situation in which learning occurs and which defines the requirements (Ramsden, I979).

4.2.4 Motivation

"The gates of fame are open wide,
It's halls are always full.
And some go in by the door marked 'push'
And some by the door marked 'pull'".

(Traditional Nursery Rhymne)

Many lecturers believe that motivation is the single most important factor in academic achievement (Svensson, 1977). Empirical research opinion is that motivation and achievement have a more complex relationship than is popularly supposed.

One viewpoint represented in the Literature is that of traditional Behaviourism. The Behaviourist model is focused on the intensity dimension of motivation. Results have been obtained which indicate that both positive and negative correlation coefficients can be established between intensity of motivation and the level of performance by learners.

An implication is that extremely high levels of motivation can be inhibiting and the probability is that it generates too much anxiety and fear of failure.

A study by Robertson and Molloy (I982), reported in the British Journal of educational Psychology, suggests that certain students registered for Ph.D. degrees at Aston University experience what they describe as *"interferring effects of worry"* which have a detrimental effect on study behaviours. A reference to Sarason (I975, p. I78) is made in the Study and it states that :

"Worry is an attentionally demanding activity ... the time spent worrying about one's level of adequacy can be expected to interfere with task performance."

On the other hand, too little motivation is a depressant on performance. A study by Wankowski (I973) establishes that when students are compared as well motivated and poorly motivated for the future, differences are identifiably apparent in terms of how well or badly they perform in examinations. Those students who are poorly motivated can be expected to be more likely to fail than those who are well motivated. In the Study there was a failure rate of one in forty for the for the well motivated and one in six for the others.

The Behaviourist viewpoint of a curvilinear relationship between motivation and performance as expressed by the Yerkes Dodson Law has been criticised as naive because it is descriptive of only one type of motivation (Biggs, I97I).

Spence (I959); Dewey (I930); White (I959); Bruner (I966); Fransson (I977) and Beard (I980) have independently emphasised the need to distinguish between different types of motivation in any investigative research into the relationship between motivation and performance.

A study be Saltz (I97I) suggests that the notion of a curvilinear relationship should be regarded as a combined effect of at least two different types of motivation. The first is a *fear of failure* and the second is *incentive to succeed* through the use of rewards.

What is being suggested is that intrinsic motivation and extrinsic motivation lead to different kinds of learning behaviours and that they need discriminating. White (I959) also identified between types of motivation calling them *drive reduction* and *competence motivation.* Lefeaurt (I976) identifies what he calls the different effects of *internal locus of control* from *external locus of control* on learning behaviours and he sees these as dimensions of motivation.

Studies by Bruner (I966), Beard (I980) and Fransson (I977) examine the effects of one type of motivation on learning behaviours. They focus on *external rewards* to observe how incentives like lecturer and peer group approval and assignment marks vary in their motivational strength between different groups of students.

The focus parallels that of Barker Lunn (I967) who examined the effects of external versus internal motivation in primary school pupils. A similar unpublished review of reward preferences in students at The Polytechnic of Wales (Williams and Morgan, I977) found a discrepancy between what students find motivating and what lecturers perceive students find motivating. The tendency was for lecturers to believe that students are almost wholly intrinsically motivated but for students to actively seek external reinforcements. This had been found to be the case in the primary school sample (Barker Lunn, I967) although there were social class differences reflected in the pupils' preferences.

A study by Entwistle (I974) suggests that research ought to distinguish between not two types of motivation but three types. He wishes to qualify the previous studies' use of the terminology *intrinsic motivation* so that it labels two sub divisions as follows :

(a) extrinsic motivation involving incentives and rewards;

(b) intrinsic which stems from interest in the subject itself;

(c) intrinsic which depends on the maintenance of self esteem.

The Study links this third category of motivational type with achievement motivation, called *hope for success* (Atkinson and Raynor, I974). The converse of this,called *fear of failure* is part of the same concept. Entwistle and Wilson (I977) found that both kinds of intrinsic motivation lead to different study behaviours as does the first kind of motivation, called extrinsic. An example of this is described (Entwistle and Wilson, I977, p. I29) :

Students with high academic self concept and high achievement needs tend to get high study habits scores when tested and as a type appear to be, *"a rather cold and ruthless individual- governed by rationality and spurred on by competition to repeated demonstrations of intellectual mastery."* Students with low academic self concept and high fear of failure tend to get low study habits scores. Nevertheless, they often succeed academically but the trend is that as a student group they are inferior to the former student type.

A recent study by Sjoberg (I984) has examined the effects of Entwistle's motivational types. Sjoberg agrees with Bates (I979) in stating that the effects of rewards on motivation for academic learning are complex. For example, Sjoberg (I982) previously found that there is a decrease in interest expressed by students for their subjects when extrinsically rewarded. He accounts for this with the observation that the effect seems due to student belief that reward behaviour is instrumental. He sees the relationship between strength of interest in subjects and marks gained within it as having two aspects. On the one hand, students who receive high marks might develop an interest in the subject but on the other hand, students who receive low marks will lose interest. In this way a rewards system directly affects interest levels.

Sjoberg further suggests that group referenced marking which awards grades according to the standard of the student group, is seen as more punitive than criterion referenced marking, which is awarding grades against some ideal standard. He feels that it is likely that group referenced marking, perceived as punitive, is more influential in destroying interest than any other form of external rewards.

Sjoberg refers to previous results published by McGraw (I978) which provide evidence of the detrimental effects of rewards on students' performance on routine tasks. Although individual differences emerge McGraw concludes that in general terms the use of external rewards leads to superficial learning sets.

There is considerable support for this notion elsewhere in the Literature. A pioneer study by Marton (I976) found that when students are told to read an academic article with the instruction that they would be tested on their retention of it certain effects follow.

These effects result from students' interpretations of the instruction.

Some students interpret an expectation that a thorough understanding of the text will be required while others interpret that an accurate reporduction is needed.

A follow up study by Marton and Saljo (I976) suggests that the ways in which students interpret learning task requirements create intentions for learning approaches. These approaches lead to distinctive processes of learning behaviours and to different levels of understanding.

Marton and Saljo (I976) refer to these levels of understanding as *surface level* and *deep level* which label procedures of learning which are characteristically *rote memorisation* and *conceptual grasp.*

A study by Fransson (I977) takes the ideas of Marton (I966) and Marton and Saljo (I976) further. Fransson, and later on other studies too (Entwistle and Robinson, I976; Entwistle, I979), sub divide the two levels identified into sub categories dependent on the degree of activity, activity, attention and involvement shown by students.

These sub categories are described as *deep active level* and *deep passive level*, and, *surface active level* and *surface passive level.* Fransson believes that these develop different study behaviours and variability in academic achievement. Support for this comes from Svensson (I977) who researched with Fransson at Gothenburg University. Svensson observes that deep level approaches lead to deep level understanding and to superior long term recall.

Svensson believes that the relationship is inevitable and that while it remains possible for students using a deep level approach to fail to achieve deep level understanding for various reasons like lack of prior knowledge or poor effort in studying, it is impossible for students using surface level approach to reach deep level understanding.

Svensson (I977) additionally refers directly to the effect of these approaches on study habits. He comments that there is evidence to support the proposition that deep level approach is associated with more time spent studying than is surface level approach. His reasons for this association are expressed in terms of more intense involvement with a subject generates more interest which sustains effort.

Surface level approach, Svensson (I977) suggests, tend to associate with techniques of rote memorisation which is boring and which leads to less time spent studying. Fransson (I977) is supportive of this.

Fransson (I977) observes that students motivated with little interest adopt surface level approach which is described as follows:

"In the case of surface level processing, the student directs attention towards learning the text itself; ie. he has a reproductive conception of learning which means he is more or less forced to keep to a rote learning strategy. In the case of deep level processing the student is directed towards the intentional content of the learning material; ie. he is directed towards comprehending what the author wants to say and the underlying principles of the argument."

When the relevance of the task to students becomes the main reason for learning then the students are intrinsically motivated. Fransson quotes Partnas's (1976) statement that intrinsic motivation, *"Is not to be created, it is to be found."* The implication of this statement is that it is unavailable for manipulation and control.

Students who are intrinsically motivated and who are described as deep level processors by Fransson, tend to give *conclusion oriented answers* which are discussive and synoptic or alternatively they might give *conclusion oriented mentioning answers* which are partially synoptic but with no overall summary of what they have learned.

On the other hand, students who are surface level processors tend to give descriptive summaries of their learning. There is no alternative available to these students who can achieve only the one type of recall. Fransson believes that deep level processors are adaptable to task requirements and so can demonstrate a variety of answering strategies.

There is support in the Literature for flexibility in learning strategies. Marton and Saljo (1976); Svensson (1977); Cohen and Toomey (1973) and Ramsden and Entwistle (1982) independently describe ways in which students adapt their study behaviours to perceptions about task requirements.

The empirical research has support at *grass roots* level in that lecturers opinions often confirm the notion that motivation inspired by fear of failure or hope of success rather than by intrinsic interest develop different ways of approaching academic life.

Students motivated by means to ends relationships and for whom examinations are a sole criterion of achievement are encouraged to use what Meighan (I98I) calls a *reproductive learning strategy* and what Holt (1976) calls *right answerism.* In the early nineteen hundreds Dewey (I910) had made the same observation in his educational treatise and the notion appears again in the nineteen seventies in the writings of Edfeld (I976) which states that :

"The natural impulse of the intrinsically motivated student, unthreatened by expectations of a factual knowledge test, is deep level processing."

An implication of this is that if deep level approach is to be encouraged the threatening conditions of examinations need removal. That is, examinations need substituting with more appropriate criteria.

What these studies are in the main suggesting is a model of student learning with three related interconnecting components. These components can be identified as *intention for learning* and *processes of learning* and *outcomes of learning*. Biggs (I978) describes such a model in terms of *dimensions of study processes* which interrelates the personality characteristics, the motivational type and the study habits of students.

This interrelationship is described as follows (Biggs, I979, p. 383) :

(i) The utilising dimension has an affective component made up of two interrelated motives. These are, firstly, the pragmatic reason for being at university which is to get a degree and secondly, the reason for studying which is fear of failure.

Biggs believes that in the absence of a good reason for wanting to achieve graduate status, fear of failure becomes the important one and resulting behaviours are geared towards avoiding the consequences of not studying. Students are said by Biggs to become increasingly syllabus bound and to study as little as possible with a view to passing examinations through a reproduction of lecture notes.

(ii) The internalising dimension has an affective component of intrinsic motivation arising from a need for self actualisation

Biggs views subjects which are found interesting for their own sakes as leading to wide reading around lecture notes and to learning in a syllabus free way. The outcome is generally that of a conceptual grasp of the subject, what cognitivists call *meaningful learning.*

(iii) The achieving dimension is characterised by a motivational component of competitive behaviours. Study habits are directed towards achievement and superiority.

Biggs suggests that good organisational ability is a key study skill here in that study times are allocated by students and that course assignments are typically on time. It is a cool and systematic approach to study.

Biggs's model bears some unacknowledged debt to that proposed earlier by Das (I975) describing three dimensions borrowed from Luria's model of cerebral functioning. The dimensions are those of :

successive processing, and, *simultaneous processing,* and, *planning.*

Biggs (1975, p. 383) has written that, in relation to these dimensions, it is :

Tempting to argue that these latter dimensions form genotypes of those phenotypically revealled in studying as utilising, internalising and achieving."

Some have considered there to be an overestimation of the consistency of motivational variables and study habits in student groups. For example, it might be the case that an internaliser ceases to be one over a period of three years at university and that study habits and levels of learning approach change.

Laurillard (1979) has demonstrated that differences in learning approach occur when tasks are different even within the same subject area. She concludes that this is evidence of task specificity affecting approach.

In answer to the criticisms, Svensson (1977) argues that evidence exists to support the argument for consistency in learning approach between experimental task situation and the actual classroom context. This is more of a defense against a criticism of artificiality of task content but Biggs (1979) has demonstrated a consistency in behaviours across different tasks and in different contexts.

He and others (Marton, 1976) suggest that there is evidence for some task specificity because the nature of the task and the situation of the learning affect behaviours, but he emphasises the occurence of consistent behaviours in many instances. He considers this evidence to be sufficient to claim that the consistency comprises (Biggs, 1979, p. 398) :

"Predilections for studying and motives for being at university."

Biggs further suggests the importance of these predilections when he writes that (Biggs, 1979, p. 393) :

"In the interests of fairness the tertiary educator needs to take these issues into account."

Entwistle (1979, p. 367) suggests a compromise to the debate on consistency when he says that both consistency and variability in students' study behaviours and levels of understanding can be accepted without confusion. He says that :

"It appears legitimate for researchers to concentrate on either the consistency or variability providing that to focus on one of the two types of description is not to deny the existence or the importance of the other."

This compromise view accommodates variability in students' learning behaviours without rejection of the notion that approaches to studying and understanding are individual difference variables. It is similar to the viewpoint expressed by Fransson (1977) that students might have the facility to be adaptable in their choice of approach . This recognises the effect of task and context requirements without losing the individual.

Summary

1. Learning and motivation have a more complex relationship than is popularly supposed (Svensson, 1977).

2. Studies emphasise the need to distinguish between types of motivation (Biggs, 1971).

3. One study suggests that there are three, and not two, types of motivation (Entwistle, 1974). Evidence suggests that the motivational type identified as predominant in students leads to different kinds of learning behaviours.

4. Some studies have examined study habits as an important link between motivation and learning performance (Biggs, 1971).

5. Interpretation of task requirements is identified as leading to different habits and approaches to learning (Svensson, 1977; Fransson, 1971; Marton and Saljo, 1976).

6. There is some evidence to suggest that these approaches have consistency across tasks and contexts (Svensson, 1977).

7. Criticism of this exists (Laurillard, 1978) with the suggestion that approaches to learning are generated by task and situational requirements.

8. If approaches are considered to be an individual characteristic there is still the possibility that task and situational factors play a role in the choice of approach adopted (Marton and Saljo, 1976). An implication is that situations constraining the use of highly evaluated approaches should be removed (ie. examinations).

9. A distinction is made between the effective use of external motivators like rewards and incentives. It is suggested that for students who are intrinsically motivated by interest generated within a subject, the use of incentives is ineffective.

4.2.5 Time of Studying

"Work expands to fill the time available for its completion."
(Parkinson's Law)

A suggestion is emerging in the Literature that the actual time when studying occurs has an effect on learning processes and on learning performance. Although there is no conclusive empirical evidence available concerning the association between time spent studying and learning performance, it has been demonstrated that the time of day when studying occurs effects the level of examination performance (Doskin and Laurentiva, 1974).

Doskin and Laurentiva suggest that morning, afternoon and evening studying have separate effects on students' learning abilities. In a sample of Russian undergraduates they found that effectiveness of learning at different times of the day varied when measured as recall in examination conditions.

The difference in recall rate between morning, afternoon and evening study times occurred when students were tested in matched groups for physiological characteristics.

The physiological characteristics identified in the Study are those of *arousal* and *inhibition*. Arousal shows greater excitation during different times of the day and this was used to define a physiological student type.

Some types were shown to produce superior performance after studying during the morning whilst others showed superior performance after studying during the afternoon or the evening.

Common sense and ancedotal stories familiar to lecturers in higher education give a face validity to these results. Students and lecturers consider themselves best able to study at certain times and that the optimal time of day for them to study produces more effective results.

They further suggest that the preference for morning or afternoon or evening studying also applies to timetables classes when lectures and seminars and practical assignments are attended. Certain students have additionally commented (unpublished notes, Williams, 1984) that they believe their examination performance is affected by having to sit examination papers at unfavourable times .

It is interesting to find research adding a physiological variable to the traditionally recognised cognitive and behavioural ones. It is only in those studies examining dispositional characteristics of personality that differences in physiological attributes are considered. The work of Eysenck (1970) on the biological bases of personality is an example of the way in which arousal and inhibition have been previously recognised in their inference from introvert and extravert behaviours.

It would be an interesting area of further research to investigate the effects of these physiological variables on study behaviour and examination performance further.

Summary

I. The times when studying occur are said to have an effect on learning processes and learning achievement (Doskin and Laurentiva, I974).

2. Their Study concludes that morning, afternoon and evening periods of study are suitable for students of different physiological types.

3. Future research might examine the effects of physiological attributes further and investigate the relationship with study habits and learning achievement.

4.2.6 Amount Of Time Spent Studying

> *"That's the reason they're called lessons", the Gryphon remarked, "Because they lessen from day to day."*
>
> *(Lewis Carroll, Alice In Wonderland)*

It is suggested that the number of hours students spend studying is a much neglected variable of performance (Williams, 1935).

A small number of studies have examined the relationship between the amount of time spent studying and examination performance and these were mainly done during the years 1923 to 1935 (Savage, 1972).

These early studies typically use self reported data. The technique of data collection is the use of a log book in which students keep a current record of how long they study or make retrospective estimates for a particular week during the term. This was suggested by Hopkins (1929) to be more reliable than free guesses by students.

Hopkins (1929) used study time log books in his study at Minnesota University. First year students recorded their study hours for laboratory work and library work. Social events were also recorded as were leisure time and domestic duties.

Analysis reveals that the average student claims to spend twenty six hours a week studying compared with twenty one hours attending classes. This total combined time spent in academic pursuits of forty seven hours contrasts with eight hours spent socialising and one and a half hours spent on course related activities on campus, and ten hours spent on leisure and six and a half occupied with domestic duties (Hopkins, I929).

The reliability of the data is not established but it has value in its comparison of time allocations. Hopkins's study is paralleld by another carried out three years later at Yale University by Crawford (I932).

Crawford found reported logged study times of eighteen hours a week with ten hours a week allocated to sport and leisure. This compares with fifteen hours spent in timetabled classes.

A third study examining how much time students allocate to studying was done by Williams in I935. Williams made inter university comparisons of students' study time logs at Yale, at Syracuse and at Iowa and at Minnesota universities.

He finds discrepancies in the estimated number of hours students claim they spent studying between the four university groups. He suggests that this might be a feature of variability in mean levels of intelligence. He writes in his discussion of results (Williams, I935, p. 683) that :

"Students of superior ability tend to study fewer hours than students of lower ability."

Williams offers no empirical justification for assuming there to be a difference in the ability levels of the students in the four universities either through the use of measured intelligence scores or througha comparison of examination results.

Despite serious methodological criticism his study is interesting and he accounts for the discrepancy in the hours recorded for study time as a compensatory function. The implication is that the Minnesota students work longer hours to maintain standards set by Yale students, while those at Iowa work longer hours still to keep up with students at Minnesota and at Yale universities.

The Syracuse students in the sample, who study for an average twenty four hours a week, are said to represent a moderate ability band which is reflected in the commitment to a moderate number of hours study time.

Alternative accounts for the discrepancy are that methodological error might have occurred in Williams's research design in that the study logs were kept at different times of the academic year. This means that students recorded time spent studying for a term in which summative examinations are held will predictably log more hours than students who have a non examinable term ahead of them.

Examination of the data analysed by Williams shows that the Minnesota university times logged were collected during the Fall Term; the Syracuse during the Fall Term; the Yale during the Spring Term and the Iowa during the Fall Term.

Results indicate that the highest number of hours recorded occur during the Fall (Autumn) Term which means that Yale University students, whose logs were compiled during the Spring Term, might indicate that they study less because it was a non examinable term.

British studies (Holloway, I966; Cooper and Foy, I969; Malleson, I967; Thoday, I957) tend to indicate that the number of hours students spend studying is not significantly related to their subsequent academic achievement. Holloway (I966) examines the organisational ability students possess to balance out their social and academic commitments.

Holloway's interest is in describing whether an appreciable difference exists between students in terms of organisational skill and if this relates to variability in subsequent achievement.

Results obtained by the I966 Study suggest that students who are able to combine social and academic activities in compatible ways do better in their examinations than students who spent a disproportionate time socialising.

Cooper and Foy (I969) examine the relationship between time spent studying and examination performance in a sample student population derived from all students enrolled in one university's department. They report that students claim to spend sixteen hours a week studying and that this balances out against a twenty seven hour a week timetable.

The figures offer some support for those established by Malleston (I967) in his survey of study hours reported by first year medical students, and the figures of Thoday (I957) whose data was drawn from first year undergraduates at Birmingham University.

A methodological objection to the Cooper and Foy study, however, could arise in that they asked students to freely recall their study times during a past week. The hours can be perceived as approximate only. Despite this caution when interpreting the results of the Study, the general trend is one of support for the American results.

The traditional adage of *"genius is two percent inspiration and ninety eight percent perspiration"* does not seem to be supported by the general trend reported in the empirical studies. Hard and long work does not always get the results students want. One possible reason in the discussion concerning this is that students' study time might relate to achievement in the form of a 'U' shaped learning curve.

The implication is that over work, especially over rehearsal, might produce diminishing results. One study (Fisher and Costanos, I965) did find a significant relationship between time spent studying and performance but it is negative. They write :

"In terms of time spent studying, the weaker students tried even harder than the brighter ones."

A study by Jones and Ruch (I928) had previously suggested that study time acts as a compensation for low ability and that hours spent studying decrease with higher levels of intelligence.

Williamson (I935, p. 687) had supported this in his observation :

"Counsellors who are attempting to motivate students scholastically need to keep in mind that beyond a total of, say, twenty or thirty hours a week of study, an increase in hours of study will not improve the student's scholastic standing and may actually result in emotional disturbance. Experience in counselling students leads one to conclude that a minimum of eighteen to twentey hours and a maximum of thirty to thirty five hours of study a week should enable students to get the grades that their academic aptitude makes possible."

Williams (I935, p. 688) goes on to conclude that :

"Within these limits, improvements in study habits like reading skills and interest in studying ... are important features."

Gibbons and Savage (I965) support the notion that higher numbers of hours spent studying does not appreciably increase achievement levels. They conclude, as Williams did thirty years previous, that it is what students do during their study times that is important. In other words, that a qualitative account of study behaviours is more useful than a purely quantitative account in terms of number of hours.

Thoday (I957) also made a similar observation when he recommended that investigation of students' studying needed a more complex analysis than that provided by numerical description of study time. He suggests that questionnaire design would greatly improve research design in studies of learning procedures.

Summary

I. Studies have examined the effect of the number of hours spent studying on achievement (Williams, I935; Hopkins, I929; Crawford, I932; Gibbons and Savage, I965; Cooper and Foy, I969).

2. The early studies sometimes used retrospective accounts which are unreliable (Williams, I935). The more recent studies use a technique of log books (Cooper and Foy, I969).

3. There is a suggestion that the number of hours spent studying serves a compensatory function with lower ability students studying longer than higher ability students (Williams, I935).

4. Many British studies (Cooper and Foy, I969; Malleston, I967; Thoday, I957) suggest that study time does not show any significant relationship with achievement other than an occassionally negative one.

5. The suggestion explanation for a significant negative relationship is that over studying can lead to inhibition through over rehearsal.

6. It is suggested that students who can balance out their academic and social times well do better in examinations than students who simply log up a lot of study hours (Holloway, I966).

7. Gibbons and Savage (I965) support this when they suggest that crude numerical description of studying is less useful prognostically than a qualitative description of how students study.

8. A more profitable focus for future research is to describe what study habits students have and the degree of effectiveness they appear to have in relationship with achievement.

4.2.7 Locus Of Control

"Let schoolmasters puzzle their brain,
With grammar, and nonesense, and learning,
Good liquor, I stoutly maintain,
Gives genius a better discerning."

(Oliver Goldsmith, She Stoops To Conquer)

Rotter et al (I972) has described locus of control as describing :

"Whether or not an individual believes that his own behaviour, skills or internal dispositions, determine what reinforcements he receives."

Individuals are perceived as though represented along a continuum with Internals feeling that they are effective in controlling destiny and determining reinforcements, and with Externals believing that forces beyond their control like fate, chance, luck determine what happens to them.

Some studies (Carter, I969; Rotter, I966) suggest that an individual's ability to cope with environmental stress seems to be related to the locus of control. Internal locus of control tends to be associated with better handling of stress than that of external locus of control. Externals are described (Goss and Morisko, I970; Hountras and Scharf, I970) as having more debilitating anxiety, neurotic symptoms and self punitiveness in response to threatening situations.

The consequences of behaviour establish expectancies which concern academic learning situations. These expectancies can arise from instructions to students as well as from direct learning experiences. For example, a student who is told that examination success is due to luck is likely to show different expectancies than a student who is told that examination success is due to effective revision and good techniques. Students tend to apply a mythical *law of averages* to chance situations and some students might reason that failure in examinations, due to bad luck, increases their chances of success next time and vice versa. This is popularly known as the *Monte Carlo fallacy*.

It might be expected that Externals perceive themselves as having little control over their achievement levels and so be unable to take effective remedial action. The Literature supports this assumption. For example, Rotter (1966) said that it is probable that Internals will engage themselves in more achievement related activities than will Externals and support for this is reported by Crandal et al (1962); Chance (1965); Crandall et al (1965); McGhee and Crandall (1968); Brown and Strickland (1972); Bar-Tal et al (1980); Barling (1982).

These studies have generally found that levels of achievement for Internals is consistently higher than for Externals. However the association between locus of control and ability factors is not consistently agreed upon.

Some studies (Bialer, 1961; Chance, 1965; Crandall et al, 1965) report a positive relationship between IQ and I-E scores, with Internals reported as having higher measured intelligence. Other studies (Battle and Rotter, 1963; Shaw and Uhl, 1971) report no significant relationship between IQ and I-E scores.

It is probably the case that locus of control is a determinant of how students receive information (Rotter, 1966). This is supported by

Davis and Phares (I967) and Phares (I968) who suggest that Internals acquire information more actively and use it more effectively than Externals. They additionally suggest that Internals make more accurate predictions for self relevant achievement outcomes than do Externals. This has been confirmed by Wolfe (I972) and by Steiger et al (I973).

This observation relates to findings by Gilmor and Reid (I978) who establish that Internals have higher self concepts concerning likely achievement. Confirmation is given by results of a study by Maqsud (I983) who investigates the relationship between self concept and locus of control in a group of Nigerian undergraduates.

Maqsud (I983) finds Internals more accurate predictors of their academic performance. He reports further that, in line with the findings of Phares (I968) and Barling (I982) that Internals are more active in seeking information and utilising it effectively. It is suggested too, that Externals despite their inferiority tend to have overestimations of their ability.

Barling (I982) makes the interesting conclusion that Internals are more often intrinsically motivated and that the use of incentives are of no consequence to them. Lower performance in Internals, he suggests, may be enhanced by self determined standards and incentives provided that the students have sufficient ability and skills.

A conclusion drawn from the Literature is that locus of control can be seen as an appraisal of the degree to which an individual views himself as having a causal role in determining his life course. This seems a useful variable to examine in the context of academic life.

Summary

I. Locus of control describes people's feelings of self control in their lives (Rotter, I966)

2. Internals believe themselves to be responsible for their lives but Externals believe in fate and luck and chance.

3. Studies (Carter, I969; Rotter, I966) suggest a relationship between locus of control and coping with stress. Externals are seen to have more debilitating anxiety (Goss and Morisko, I970)

4. Consequences for learning are suggested (Phares, I968; Davis and Phares, I967). Internals are reported to be more active in seeking information and more efficient in utilising it.

5. Internals are reported to be more realistic in their self concept concerning achievement (Wolfe, I972).

6. This is confirmed (Steiger et al, I973) and it is suggested that Internals make more accurate predictions concerning academic success and failure (Maqsud, I983).

7. It is further suggested (Barling, I982) that Internals are motivated differently from Externals. Internals do need extrinsic rewards but low performance Internals might respond to self determined standards and incentives. Externals tend towards the use of extrinsic incentives.

4.3 Study Habits and Contextual Variables

> *"I have never let my schooling interfere with my education".*
> *(Mark Twain)*

Parlett (I977, p. 274) writing in *Higher Education* says that :

"An individual's intellectual life, working habits, personal values and even ways of speaking and mannerisms, may all be attributed to the lasting influence of his or her former place of education."

Although there has been no systematic study of the long term effects of institution membership on learning, and very few studies of the short term effects measured as examination performance, there is evidence in the Literature of a probably effect of aspects of it.

American studies have tended to compare environments in higher education (Pace, I967; Stern, I970; Peterson, I965; Long, I978) for their effects on student performance as graduates and these studies have been reviewed by Entwistle and Ramsden (I983).

The few British studies in the Literature have mainly looked at aspects of institutional membership like departmental or faculty membership.

Reviewing the results of the American and the British research, Entwistle and Ramsden (I983) suggest that there is evidence for students' departmental membership to be associated with different approaches to learning. For example, reference is made to a study by Becker and Kogan (1980) which identifies differences in commitment to teaching and research and technology in departments. Additionally they observe a difference of what they call, *cohesiveness of curriculum content* which they believe affects students' learning behaviours.

Hajnal (1972) and Schwab (1964) had earlier observed departmental differences in the concept of knowledge structures and this is supported by Bernstein (1971) who identifies variability in departmental control of what is taught and in the definition of subject content boundaries. Bernstein also describes differences in the standards of departments measured in terms of published research papers and student evaluation.

Entwistle and Ramsden (1983) comment that these contextual factors are responsible for determining things like the formality or informality of lecturing and learning interactions; the availability of choice of subject options and the form of examinations to assess learning. These things are perceived as directly influencing students approaches to learning within departments.

No empirical study has investigated the effects of all these factors on student learning and achievement but lecturers appear to be often highly conscious of their institutions as learning milieux (Parlett, 1977). Henry James once described the milieu within which he and his brother, William James, were educated. He writes (cite, Parlett, 1977, p. 179) that :

"What I speak of is the medium itself, of course, that we were most immediately steeped in."

Parlett's research examines the milieu of departmental membership within universities in Britain. He emphasises that attention must be paid to the effects of this milieu on learning processes and outcomes.

4.3.1 Departmental Membership

Parlett (1977) accepts a systems theory perspective of organisations. The university and polytechnic is seen as a social system in which two dimensions, the personal and the organisational, are significant factors in producing observed behaviours.

The departments within the academic organisations are seen as *a home within the world* of the university or polytechnic and it provides the immediate milieu for studying and living.

One study, by Simons and Parlett (1977) examines the feelings of students during their first few weeks as departmental members. The students report how they did not know what to expect and how this engendered an insecurity and what some even describe as *culture shock*.

The Study describes how initial meetings between students and lecturing staff set a *departmental style* for the new students who then have their first impressions confirmed or undermined in subsequent weeks. The Study suggests that sometimes discrepancy occurs between staff and student perceptions. A parallel exists here with the research of Miller and Parlett (I974).

Simons and Parlett (I977) found that high in the hierarchy of concerns for new students in the first few weeks is the need to be recognised by lecturers outside of lecture rooms. Few lecturers appeared to appreciate how important this is for students. Support for this findings exists (Parlett, I977; Miller and Parlett, I974).

Simon and Parlett (I977) observe that a critical aspect of departmental learning milieu is what they call the *educational philosophy* evident within it. This refers to the principle of promoting independent learning or otherwise. Those departments which strongly emphasise the need for self disciplined and self motivated study, tend to have fewer timetabled hours but higher expectations about independent studying.

A problem occurs, Simon and Parlett observe, when the expectation is not internalised by students who underestimate the amount of study time expected.

A recent study at Lancaster University by Ramsden (I979) examines students' behaviours within departments. This Study analyses relationships between lecturers and students; the commitment of lecturers to lecturing and the workload they expect of students; freedom in learning and the social climate of the department.

Ramsden found that large difference exist between departments on many of these variables. Although some of the differences are said by Ramsden to be predictable, as for example between Arts and Sciences departmental groups, others are less predictable.

Previous studies have examined differences existing between Arts and Sciences student groups (Roe, 1953; Gamson, 1966; Thompson, 1969; Wilson et al, 1971). The caricature differences between them have been described in C.P. Snow's *The Two Cultures*. The popular conception is that science department lecturers are seen as more formal in their style and more authoritarian in using sanctions like fear of examination failure and penalties for late assignments. Arts departmental lecturers are seen as being very different. The implication is that students in the different departments develop separate orientations to their courses.

The emergent stereotype is of Arts types and Sciences types who are nonconformist, radical and individualistic or not, respectively. The Science type is seen as stable, convergent and with a preference for practical and vocation courses.

A study by Gaff et al (1976) describes some of these differences observed between departmental groups of students. Gaff (1976, p. 286) writes that :

"Although there are some similarities amoung the four departments, it is apparent .... that they constitute markedly different learning environments. The pressure packed, heavily prescribed nature of chemistry; the relaxed somewhat uncertain climate in Law; the memory orientation and highly structured environment in medicine and the free wheeling, independent atmosphere of psychology - these distinctive 'atmospheres' of each educational environment are apparent from this initial analysis."

One earlier study (Beard and Maddox, I962) found that the things Gaff describes sometimes differ between departments even within the same faculty. They examine the *intellectual ethos* of two engineering departments at Birmingham University and found that it leads to different requirements for learning and that this fosters variability between student groups in the departments.

Entwistle (I983) examines which specific factors of departments affect performance the most and concludes that it is possibly the assessment methods adopted by departmental Course Boards. An example of the effect examination procedures have on students is described below (Entwistle, I983, p. I04) :

"I hate to say it but what you've got to have is a list of the 'facts'. You write the ten most important points down and memorise them and then you'll do alright in the test ... if you can give a bit of factual material - so and so did that , and concluded that - for two sides of writing, you'll get a good mark."

Entwistle (I983, p. I04) further observes that the attitudes and personalities of lecturers are important in determining students' approaches to studying. Students seem able to adopt flexible habits which are geared to the requirements of different members of staff. For example (Entwistle, 1983, p. 104) :

"I find that the courses I do most work on are the courses where I get on with the tutors best ... a tutor can put you off a subject ... some of them don't like students."

"When it comes to writing essays, because I'm not very interested in it, I tend to rush through the books I'm reading for the essay so I don't really understand it when I've finished. And because there's so much information I think you can either oversimplify it or get into too much detail. I think I tend to oversimplify."

Entwistle concludes that of particular importance is the interest shown by lecturers in students' progress and the quality of their interpersonal relationships along with the use of guided reading.

In conclusion, it appears from studies in the Literature, that there is support for the notion of contextual effects, defined as departmental membership, on students' approaches to studying.

Summary

I. There is a demonstrable effect of learning milieu on learning approaches (Parlett, I977).

2. An aspect of milieu affecting students' learning is that of departmental membership. Two significant factors are the personological and the organisational relationships within it (Parlett, I977).

3. Interactions between students and lecturers establish a style determining an educational philosophy leading to expectations about learning behaviours (Simon and Parlett, I977).

4. The single most important aspect of the educational philosophy is said to be that of examination procedures (Entwistle, I983).

5. Other important aspects are lecturers' attitudes and personality and the quality of the interaction they share with students (Entwistle, .983).

6. The overall conclusion seems to be that departmental membership affects the ways in which students study and as such this constitutes a contextual variable of learning behaviour.

(b) LEARNING STRATEGIES

"And still they gaz'd, and still the wonder grew,
That one small head could carry all he knew."
(Oliver Goldsmith, The Deserted Village, I, 2II)

There is a history of enquiry into the ways in which individuals learn. Aristotle and Plato both considered conceptual learning to be concerned with the acquisition of universal knowledge. This ancient Greek view of knowledge suggests that concepts are distinct from, but related to, particular objects and events existing within the real world. The absoluteness of knowledge means that there are appropriate routes to it and that alternatives are unsuccessful.

The medieval view of Abelard was the recognition of a distinction between the universal and the particular ideas of knowledge, the one existing in reality, and the other recognised to be of the mind alone.

Speculation about the nature of knowledge and knowing persisted as a debate between the Rationalist and the Empiricist philosophers. The Empiricists claim that knowledge is experientially based, while the Rationalists claim knowledge to be inherent within the person.

Bruner (1983, p. 65), commenting briefly on this debate in a retrospective account of his early rumminations as a student, says that the argument between the philosophies is over whether, *"mind is seen as a captive of the senses, or whether the senses are seen as captive of the mind."*

The philosophical debate persisted and was represented by the British Empiricists, Locke, Hume and Mill who proposed the *knowing from experience* argument, and the Continental Rationalists, Descartes and Kant who proposed the *knowing from being* argument.

The first application of the scientific method to resolving the debate in psychology as a subject field, came with Wundt's establishment of a laboratory at Leibzig University in the late eighteen hundreds.The study of cognition was begun with the use of empirical procedures which replaced the earlier exploratory use of introspection.

Methodological problems of reliability and validity mean that the earlier procedures for research which used introspection achieved little consensus about cognition. The *clear window into the mind* that had been hoped for was found to be unattainable because cognitive functioning is not open to conscious experience.

Anderson (I980) reviews the early pioneer years in the study of cognition and suggests that realisation about the inappropriateness of introspection as a technique led directly to the Behaviourist revolution led by Watson in the I930's. He quotes from the writings of Watson (I930, p. 2) as illustrative of the old methods (Anderson, I980, p. 8) :

"Belief in the existence of consciousness goes back to the early days of superstition and magic."

No agreed Behaviourist model of consciousness evolved but Skinner (I957) represents one view with his suggestion that concepts are abstractions resulting from the process of bringing behaviour under the control of a single property or special combination of properties of a stimulus, whilst free from the control of all other properties.

Skinner suggests that any property of a stimulus present when a response is reinforced acquires some degree of control over that response and the control continues to be exerted when in other combinations of the property.

An alternative view is presented by Harlow (I959) who suggests that concept learning is the acquisition of learning sets. This notion develops from his research work with primates who show progressively greater ability in learning discriminations in experimental tasks. Harlow believes that the progression is evidence of acquiring a set.

The parallel process in human subjects is referred to by Harlow as the establishment of broad stimulus categories which are generalised from initial problem solving.

Anderson (I980) considers that the subsequent research developments of the Neo-Behaviourists who introduced the notion of *covert mediators* led directly to the evolution of cognitive psychology. Representatives of Neo-Behaviourism are Osgood (I957); Newell and Simon (I972) on computer simulation, and Galanter and Pribam (I960's) on artificial intelligence.

The origins of the evolution are said by Anderson (I980) to be in the publication of Neisser's (I967) *Cognitive Psychology* and with the publication of the *Journal of Cognitive Psychology*. These are considered to be milestones in the historical development of research into concept learning because they are a watershed between orthodox Behaviourist models and the later mediating theories of post Neisser.

Klahr (I976) refers to the post Neisser research as focusing on the, *knowledge gathering processes* that describe how we come what we know. The intellect climate, *the zeitgeist*, following Neisser influenced mainstream interpretations of knowledge and knowing in a way different from before.

Bruner (I983), in his autobiography, dewcribes how the influence of zeitgeist works in the establishment of new models so making research investigation *a child of its times*. He recalls how the interpretation of knowledge popular with the post Neisser era became known as *The New Look*. He describes it (Bruner, I983, p. 32I) as follows :

"The proceedings, at least formally started some quarter of a century ago with a series of publications (Bruner and Postman, I947; McGinnies, I949; Postman, Bruner and McGinnies, I948) which suggested that the perception of external stimuli is not free of the shackles of internal events, attributes, values, expectations and psychodynamic defenses which impinge upon perception. This view became loosely known as 'The New Look'."

A popular joke amoung undergraduates of Bruner's time was that traditionally it was believed that the only route to *mind* was through the eye, ear, nose and throat to which the New Look replied that whilst psychology had lost its soul, it should take care not to also lose its mind (Bruner, 1983).

Opposition to the cognitive interpretations of knowledge meant that early research tended to study problem solving which has a history of academic respectability. Solutions to problems were typically called *insightful* and accounted for from within traditional learning theories.

The Gestalt theories of Kohler and Wertheimer went some way to develop cognitive theories with syllogistic reasoning tasks like, *all men are mortal, Socrates is a man, Socrates is mortal.* The concern was with establishing rules of logic in ways similar to the establishment of a manual of rules for regulating traffic. This had arguably little impact on mainstream psychological thought which Bruner (1983) suggests led to the development of clever ruses looking like procedural conventions for making mental processes seem objective. An illustration of this is as follows :

"The trick was to state your findings in centimetres, grammes and seconds ... it was Hume's voice, not Descartes's."

And again, as Bruner (1983) quotes from George Miller :

"In my opinion the use of ... mentalistic terms is still constrained by a positivist philosophy of science so that now we have in effect an oxymoron, non mentalistic cognitive psychology."

In the light of this, Bruner, Goodnow and Austin are said by Bruner (1983) to have viewed the publication of their 1956 text as a protest against the *anti intellectual corset of the times*. The book was aimed at observing and describing processes of thinking in an impeccably objective way. To accomplish this, the authors devised thinking tasks which are challenging and complex but which are open to informational analysis.

The model behind the book's approach to thinking is that of Shannon and Weaver's information processing model. This describes an experimenter's role in controlling input of information and a subject's role in selecting task relevant information.

In a symposium on cognitive theories of learning given at Colorado University in 1957, Bruner presented a research Paper called, *Going Beyond The Information Given,* which comprised an account of how individuals make the selections referred to in the model above.

The Paper describes how individuals leap beyond perceptions in principled ways. Some forms of leaping beyond the information given are logic, which is the most principled, and other forms which involve the inference of attributes of objects and events and fitting them into categories. An illustrative example of this latter procedure is the behaviour of the crowd in the opening scenes of *Superman* which the film shows to be attempts to search their categories for an interpretation of what they see : *"Is it a bird? Is it a plane? It's Superman."*

Going beyond the information given involves decisions and inference made on the basis of learned rules. The ability to formulate an abstract concept, for example, depends on rules governing category membership which are the presence or otherwise of essential attributes defining the concept.

Bartlett (1932) seems to have anticipated much of this modern view. He describes how knowledge is organised into units of meaning called *schema* which allows new instances to be recognised as examples of type met with before. This ability to discriminate and recognise class characteristics makes the learning of new instances as unique things unnecessary and redundant.

Bruner (1957) describes much the same thing when he refers to things which are related together combining into *structures*. It is a process of actively constructing knowledge by relating new information with existing knowledge called *a frame of reference*. It is by a person's frame of reference that the world's objects, ideas and events are known. Bruner calls this an *internal model of reality* and distinguishes it from the outer reality of the world.

In some ways this is evocative of Plato's cave image in *The Republic*. The shadows of Plato's cave match the realism of Bruner's world. Bruner and Anglin (1973) have written that :

"Individuals do not mechanically associate specific responses with specific stimuli but rather tend to infer principles or rules underlying the patterns which allow them to transform their learning to different problems."

An implication is that students with concepts comprising a wide frame of reference can do things which other students cannot. If a concept is an abstraction approximating to some sort of internal event, then it can be used as a *category dump* for new ideas and for solving problems and for communication.

An example of this is as follows. Medical students have ready made concepts like *poisonous; reduces fever; relieves pain* which are important categories for them to use. The medical students need to learn what it is about drugs that give them these properties. In the same way, psychology students have concepts like *evidence; intelligent; abnormal* which are important categories for them. The emphasis is not on acquiring concepts because they already have them, but on learning how to use them correctly and how to recognise instances of them when they come across them.

There are many kinds of concepts although one kind in particular is used extensively in the Literature for examination. This is the class concept which exemplifies classification as conceptualisation. Classification is a useful way of interpreting experience and it is based upon relations of class inclusion and exclusion.

Vinacke (I952) describes what concepts are along with their main function. This is summarised as follows :

a. Concepts are the products of past experience and learning from responses to characteristic situations and stimuli.

b. Concept use involves applying past learning to present situations.

c. Concepts link separate experiences and information together.

d. The linking is done through the use of symbols which include words.

e. Concepts have an extensional use and an intensional use. The former is universal in meaning for everyone who uses the concept but the latter is a conatative use reflecting private experiences.

f. Some concepts are irrational, like the 'unlucky number I3'.

g. Some concepts are subconsciously formulated in that a person can habitually respond to a stimulus without being able to discriminate or describe the behaviour.

Thomson (I966) summarises Vinacke's (I952) comments concerning the functions of concepts in a twofold manner. He describes the functions :

a. To relate previous learning to present situations and experience.

b. To influence and organise each other as a complex system influencing behaviour independently of sensory stimulation.

Although it is class concepts which are described in the Literature, it is appropriate to briefly describe the alternatives kinds of concepts referred to on the previous page.

Types of concepts

a. Class concepts are simple and refer to how some things are included and some excluded in defining the characteristic attributes of a class of objects, ideas or events. There are unidimensional classes which have one attribute only, examples of which are *colour, shape, size*.
Multidimensional classes have two or more attributes in common as in *colour and shape, colour and size, shape and size*.

   Class concepts can be defined extensionally by identification of instances included in them, or, intensionally by describing their attributes.

   They can be conjunctive as when two attributes together define a class, or, disjunctive as when any one attribute defines a class. Examples are *female undergraduate* as opposed to *undergraduate*.

A third kind of class concept is the relational class identified by having relationships existing between the attributes rather than instances having attributes in common.

b. Dimensional concepts have nothing in common with class concepts differing in being continuous when class concepts are discrete. Dimensions are the continuous properties or attributes abstracted from specific objects or events and which are associated with general terms like *credible, useful, poor.*

   Children use dimensional concepts like *big, small* which precede the use of dimensional concepts like *very small, great* which become available at later developmental stages.

c. Explanatory concepts are sometimes called principles and they are abstractions of a higher order complexity than (a) or (b) because they state a relationship between concepts. Usually this takes the form of a proposition which can be true or false.

d. Singular concepts are single events or objects or ideas like *the sun, me* and sometimes they are used for constructs like *God, the world.* Referents can be perceptually perceived and their attributes are organised together by their association with the referent.

Class concepts are only a part of a much wider field of conceptual behaviour but the ways in which class concepts are used goes some way towards describing how people use classification to organise information for learning.

Bruner (I956) distinguishes, in his research investigation into class concepts, between approaches to learning and using class concepts which he identifies as *identity categorisations* and *equivalence categorisations.*

Identity categorisation occurs when a variety of things are perceived as being forms of the same thing. Examples are the recognition of a person at different stages of growth, different forms of government as being democratic; a figure perceived from different angles.

Equivalence categorisation is defined as the recognition of discriminably different things as being of the same kind, or, amounting to the same thing. This type of recognition can be of three kinds and these are called *affective, functional, formal.*

Affective equivalence means that things placed in the same class have a common affective response. An example of this is *social groups, skin colour, Behaviourist theories.* These are grouped together as being alike or of the same kind of thing. The common factor is the evocation of an affective response rather than the existence of common properties.

Functional equivalence is defined in terms of specific external characteristics needed to fulfill specific task requirements. Examples include *lectures long enough to be boring, vehicles big enough to carry troops in, students prepared enough for examinations.* Bartlett (I95I) had suggested that functional categories have a *gap filling function* in serving the purpose of finding out which step to take next.

Formal equivalence is the specification of intrinsic attributes required in specific instances. These defining attributes sometimes employ jargon to indicate that formal and not functional equivalence is intended. An example is the concept *force* in physics. Other examples might be *reinforcement* which has separate meanings in psychology and engineering, and *transparency* which means different things in sociology and in chemistry.

There are close associations between these three ways of recognising equivalence categorisations but Bruner suggests that the processes by which they are used might develop variable approaches to learning.

Most studies in the Literature, including those of Bruner which are discussed in the next pages, use tasks which require formal equivalence categorisation of class concepts. These studies tend to describe the processes of learning observed as constituting *strategies* or *styles*. The terminology has probably come about because of confusion over terms like *processes* which Biggs (I977) describes as an umbrella word for strategies and styles. Alternatively it may be because *strategies* denotes activity or decision and so is a preferred term. This is discussed in the chapter on definitions of terms.

First of the studies to be reviewed here is that of Bruner et al (I956) which is selected by the present Study as the basis for further investigation in a parallel examination of the approaches to concept identification observed in a sample of polytechnic students.

4.4. Focusing And Scanning (Bruner et al, 1956)

Bruner, Goodnow and Austin's (1956) publication, *A Study Of Thinking*, is the earliest most influential work on concept identification as hypothesis testing. The notion is that subjects will select hypotheses consistent with the stimulus input of a task and proceed to test them one at a time or all together or as a subset of hypotheses.

It is a procedure of finding out which things belong together in common classes and why. The method is experimental and it adopts a procedure of using a series of cards varying in attributes and attribute values. Subjects select cards as hypotheses and are told whether the figure represented on it is *in* or *out* of the class.

Information is fed back to the subjects through the examiner's response that a figure is a *positive* or a *negative* instance of the concept. Subjects could select figures randomly but Bruner suggests that this rarely happens and that choice invariable reflects a notion of how to proceed which is rule governed. Rules generate strategies, which Bruner describes as ways of sequencing encounters to learn what defines a class.

Some strategies are quicker than others, some are riskier and some are more certain or more flexible.The choice of a strategy is said to depend on the amount of information available and constraints of time as well as individual differences like the degree of risk a subject is prepared to take. Bruner observes that changing one or other of these conditions encourages the adoption of alternative strategies which come about to meet the new conditions.

There is here a suggestion that strategies reflect external conditions and characteristics of the user. Bruner comes closest to recognising strategies as individual difference variables when he observes (Bruner, 1983, p. 117) that :

"A strategy must respect the limitations of its user."

In the 1956 Study it is suggested that although there is an obvious strategy which presents itself it is rarely used by subjects. This is called a *super rational strategy* and it describes a procedure os listing the criteria for grouping exemplars of a concept and ticking off those eliminated by each selection made. It is a computer programme approach with extreme demands on memory. It is the unrealistic demand made on memory capacity that prohibts its adoption by human subjects. Bruner (1983, p. 118) comments that :

"It exceeds the magic number of seven plus or minus two in its demands on memory and is impossibe."

With the unavailability of this strategy for subjects, Bruner describes alternatives. One of these is identified as *Focusing*. Bruner describes the strategy of focusing in his retrospective account of the I956 Study (Bruner, I983, p. II7) :

"The subject picks a positive card and uses it as a focus or home base. He then makes choices varying one feature at a time. He can't fail to get on if the new card is still positive - the varied feature could not have been rlevant. If it is negative the feature is relevant. That is conservative focusing."

It is suggested that when external constraints like time restrictions or prohibited choice occur, subjects will often convert to a strategy called *focus gambling.* Bruner describes this as follows (Bruner, I983, p. II7) :

"You vary your choices by two or more attributes in your next choice. If you choose a positive instance you get a huge informational yield."

The gamble is that a wrong choice leads to a dead end with no steps to back track. For example, suppose that a subject starts with a card showing a stimulus figure of *two blue dotted stars* which is presented as the positive exemplar of the concept the experimenter has in mind. The subject selects a card showing *three red dotted circles* which is declared *positive* and *in* the class. The rule for the class must be *dotted figures.* However, if the response had been *negative* the subject has learned nothing because he cannot know which feature negated class membership.

Both types of focusing are strategies of eliminating attributes as in the example of the gambler testing out, *"Is number and shape important?".* In the I956 Study it was believed that sufficient evidence exists to propose alternative strategies to these.

The alternative is to test and eliminate whole hypotheses rather than their attributes. This means that a subject will test, for example, whether pattern is important not separately but as part of the total thing by asking, *"Is the concept, 'dotted figures?'"*. This is defined as Scanning and it described by Floyd (1979) as :

> *"Proceding by eliminating concepts and the number of possibilities the scanner can deal with at a time necessarily limits how many he can ask about. Although many subjects seem able to deal with more than one hypothesis at a time, few appear to be able to cope with all the possibilities at once."*

This is nearest to the super rational strategy described earlier. A scanner could proced, if he has an exceptional memory and unrestricted time, to check every stimulus figure for one possibility from all those hypotheses considered. The first negative response would lead to an abandonment of that possibility and so the next would be tested. For this reason it is called *successive scanning*.

The strategy is a difficult one for many because it takes so long and because it requires such good retentative capability. What more usually happens is that subjects use each stimulus figure to test out not one but a few possibilities at a time.

This is described as a *simultaneous scanning strategy* which requires a good memory, though not exceptional, and which requires less time.

Bruner is not especially interested in whether the choice of strategy generates from inherent predisposition or from the task itself.

In fact, in his retrospective account of his early research he hints at the effects of external factors when he writes (Bruner, 1983, p. 117) of subjects, *"tailoring strategies to fit limited opportunities for gaining new information."* This is a recognition of the influence of task and task context on strategy use which was never discussed in the 1956 Study. It is an idea which was developed after publication of the 1956 Study by one of Bruner's research students called Anglin.

Reviewing Anglin's subsequent work, Bruner (1983, p. 119) says that :

> *"The way our students went about solving our little non natural problems was in large part determined by the very non naturalness of the problems we had chosen to give them."*

And a little later on Bruner again comments that :

> *"In fact, the way our students went about solving our problems might be seen as inevitable."*

Bruner's concept tasks are called *non natural* because they represent no meaning or connotation. They are *senseless* and so unlike ordinary concepts which the philosopher Frege says have both a referent and a sense.

Ordinary concepts do not have universal properties and so the 1956 Study would have had to have use disjunctive concepts governed by silly rules like *all blue and or red figures; all stars and or circles* to have made the concepts less artificial. In this way all the figures have something in common with every other figure but not everything in common. This is rather as it is in the world with ordinary concepts.

where there are things like *vehicles* which can be *big and or small; red and or blue; with and or without windows,* and things like *vegetables* which can be *red and or brown; big and or small; round and or oval.*

The ways in which concepts like these are dealt with is probably by noting resemblances in a chain of instances through discrimination learning and then relating new things to what is already known. The important point is that the concepts are ordinary or natural and so have sense and potential meaning.

The I956 Study rationalises the artificiality of the concept tasks as an advantage and largely ignores the criticisms. Bruner comments that the issue was not an important one in their deliberations, having *"other fish to fry"* (Bruner, I983, p. II9) and so *"very little of the criticisms was made"* by them.

The major criticism is probably that the experiments were designed with features whose values could easily be found to show that concept identification is governed by some high order principle generating strategies of approach. The problem is that these strategies could be said to be appropriate only in the experimental world within which the subjects were forced to operate.

Perhaps Bruner, Goodnow and Austin perceived this as a strength and not a weakness. An advantage in using artificial tasks is that the experimenter can be precise in manipulating the informativeness of any stimulus figure. For example, if a subject selects a figure showing *two blue stars* and is told that it is not in the class, the correct class cannot be *blue figure; two stars; blue star; two figures; star*. Subsequent selections will reveal whether the subject has assimilated this information about rejected hypotheses or not.

Although the methodological procedure is limited, it was absolutely original in 1956 and went beyond any previous work in its precision. Although the Study is applicable to only a narrow range of conceptual activity it does reveal something about how people go about being modestly rational.

In summary, it could be said that the research identifies the ways in which people tailor strategies to fit limited opportunities in gaining new information. The limitations are arguably those of time restrictions and the availability of clues which are imposed by the experiment but which might not exist in real life.

It is a *tailored search*, to use Bruner's terminology, which must *respect the limitations* of the person. It seems to be the case that Bruner intends these limitations to refer to memory capacity and attentional skills. For example, he identifies focusing as the strategy with greatest economy.

The 1956 research describes how there is an almost unanimous preference for positive rather than negative knowledge in learning. The subjects of the experiments tended to use positive instances more than they did negative instances although both were of equal informational value. It was also observed that redundant information is sometimes sought by subjects even when it is not logically needed.

This need for redundant information describes an individual difference observed between those people who feel the need to check and double check their progress and those who will go ahead with little information. Bruner calls it a difference between *plodding* and *leaping*.

A comment on the I956 Study is that whilst very little interest is expressed about individual differences in learning, quite a great deal is hinted at.

For example, the existence of ideal types are said to respect the characteristics of the individual. This *respect for the limitations of the user* seems to be a statement about capabilities rather than from free choice although alternatives are said to be available when certain external restrictions occur. This means that a focusing type, for example, could use focus gambling rather than conservative focusing.

A further comment concerns the extent to which individual differences might relate to teaching situations. Bruner suggests again a lack of interest in the application of the research except for the effects that differences in the mode of presenting information have.

This refers to the mode of selection and exposition. The I956 Study used a selection mode of presenting information which means that subjects freely selected instances for testing in the experiments. The alternative is to present instances in a predetermined and fixed order which is similar to the presentation of ideas towards solution with each new idea following on from the next.

Bruner thinks that the strategies generated from within these two modes are distinct enough to be identified and measured. The first is called *Partist* because it typically takes some attributes from the exempar presented and uses them as hypotheses for testing. The second strategy that can be generated from within the expository mode is called *Wholist*. This approach involves taking all the attributes together and looking for common features in further examples.

Bruner thinks that partist strategies in the expository mode are similar to scanning within the selection mode and that wholist ones in the expository mode are similar to focusing within the selection mode.

The existence of these expository mode strategies has not been confirmed outside of an experimental situation. The concept of ecological validity makes extrapolations from experimental to classroom situation subject to qualification and yet there remains the strong common sense possibility that wholists would be identifiably distinct from partists in classroom learning situations.

A presumption is that wholists might be predisposed to prefer a lecturing style which is synoptic in coverage and which is raconteur in style. Partists would predictably prefer a well structured lecture with sub headings and information in point form delivered in a fairly formal style. Some support for this is provided by research examining specifically the effects of these sorts of preferences on learning approaches (Pask and Scott, 1972, 1976).

Roger Brown (1981) has commented on the observations recorded by Bruner in 1956 and subsequent research publications. He says that a distinction needs to be drawn between what he calls the explicit text of the 1956 publication and what he calls the subtext of implicit ideas.

Brown's point is that the 1956 text is a description of the formal experiments which were carried out and of the results which were found. The subtext, as he calls it, is a speculative introduction to possible ways of looking at the category problem. This speculative subtext, is said by Brown to, *"contain enough ideas to sustain a dozen operas "* whilst the *"thematic material of the text ... passes swiftly and is often undeveloped."*

The present Study seeks to re examine the focus of the Bruner research and to describe, if possible, something of Brown's subtext by relating the results to implications and considerations for practice.

4.5 Serialism And Holism (Pask and Scott, 1972, 1976)

In the first of the experiments reported by Pask and Scott (1972) subjects were asked to define essential attributes of imaginary concepts.

The subjects were told about two species of animal from outerspace called the *Clobbits* and the *Gandlemullers*. Their instructions were to list the principles of classification underlying their division into a series of sub species.

Forty figures contain all the information there is to know about clobbits which were drawn on cards placed in ten coloumns, each of which represented a sub species. The five rows had separate categories of information about the ten sub species like appearance and habitat.

Subjects in the experiments, were required to turn over the cards one at a time and to give reasons for their selection. Selections are seen as hypotheses which the cards test out.

Pask and Scott observe that differences in both the type of hypotheses used and the ways in which classificatory schemes are explained occur. Some subjects use a step by step approach shown in the use of simple hypothesis testing like, *"Do gandlemullers have sprongs?"*. This type of strategy is identified by Pask and Scott as a *Serialist* strategy.

Serialists are described as people who proceed in a linear progression from one hypothesis to the next whereas others combine several hypotheses together into a complex hypothesis like, *"Are there more kinds of gandlers with dorsal or cranial mounds than plongers?"*. This latter, more general approach, is identified as a *Holist* strategy.

In summary, serialists tend to describe principles of classification in logical ways and often use point form descriptions. Holists are more idiosyncratic in their presentation of information and are seen as following different rules to the serialists.

Entwistle (I983, p. 9I), reviewing the studies done by Pask and Scott, suggests that the holists' rules are more like those of journalists and novelists than of scientists. He writes :

> *"The holist starts with what seems like the most interesting or striking point and includes a good deal of human or personal interest. The holist thrives on ancedote, illustration and analogy while the serialist uses these sparingly, if at all."*

In later experimental work (I976) the description of these strategies is developed. Pask and Scott describe the holist strategy as looking at the whole area of learning with a wide perspective of inter-connections and the use of personal analogy to delay the examination of logical structures and evidence which are seen as boring. A problem with the strategy is its tendancy to over generalise from insufficient evidence and to make use of personal judgements.

The serialist is described as doing all that the holist does not.

The problem, however, with serialist strategy is the tendency to be over specific in perspective and sometimes failing to see how things fit together in a broader context.

Pask and Scott examine the relationship between learning strategies and the nature of the task which subjects are required to learn. In one experiment (1972) they matched serialists with a task requiring holist strategy for solution, and a holist with a task requiring a serialist strategy for solution.

The holist task is characterised by the use of analogy and the presence of illustrative material. The serialist task was presented as a logically developed argument with point form in a step by step format. Results of the experiment show that little overlap occurs in the mis matched group and the performance of subjects whose tasks were matched with preferred strategy. In other words, it was found that the subjects whose strategies were appropriate to the tasks retained more information than those whose strategies were inappropriate, when tested for recall.

An implication of the Pask and Scott studies is that students need to approach their learning in ways suiting their preferred styles. There is no evidence that lecturing styles are as easily dichotomised into serialist and holist approaches but there is sufficient variation in lecturing styles to create problems for students with mis matched learning strategies.

4.6 Impulsivity And Reflectivity (Kagan, 1964)

Kagan identifies learning strategies as dimensions of *reflectivity* and *impulsivity* which he says describes *conceptual tempo*. Kagan does not use the term *strategy* to label these dimensions, preferring instead to use the term *styles*.

In his experiments Kagan uses tests of accuracy and speed to measure conceptual tempo. Fast performance is taken to be indicative of an impulsive tempo and it identifies an impulsive person. The more a subject delays in the experimental tasks, the more reflective he is said to be.

The test materials used in the experiments are those of matching figures. A figure is presented along with several, very similar ones and one which is identical. The subject has to find the identical figure as quickly as possible.

Kagan believes that the selection of the identical figure builds up anxiety about responding either quickly or accurately and that measurement of the average time taken to respond, called *response latency*, along with the number of errors made, gives an index of cognitive styles.

The impulsives are anxious to identify matching figures quickly and so they characteristically make mistakes. Reflectives approach tasks more analytically and cautiously but the greater accuracy takes up more time.

Other studies (Kagan, Pearson and Welch, 1966) have suggested a relationship between dimensions of styles like impulsivity and reflectivity and learning performance.

Additional support for the notion of conceptual tempo affecting learning outcomes comes from Vernon (1978). Vernon had found, from the results obtained by his research assistant Christina Smith, that the measured intelligence of children living on the remote Hebridean islands was lower than that for children living on the Scottish mainland. A re-examination of the results showed that the lower test scores could be explained as a function of slowness in responding to a timed test. Vernon concludes that these rural children were, *"temperamentally unresponsive to the pressures of time."*

Psychometricians are aware of this difference in responsiveness to time restrictions in testing and it is accounted for by Kagan's description of impulsiveness and reflectivity.

Kagan additionally suggests that there may be a developmental trend in styles with less intellectually advanced children showing a slow inaccurate approach to learning but the more advanced intellectually showing a faster and more accurate performance.

This alternative formulation of learning strategies of students has educational implications in the recommendation that differences in conceptual tempo require accommodation by lecturers.

4.7. Field Dependence And Field Independence (Witkin, 1976, 1977)

Witkin identifies two dimensions of learning strategy which he calls *field dependence* and *field independence*. The dimensions describe the extent to which individuals are distracted by the context of their learning. Like Kagan, Witkin prefers to use the term *styles* to refer to these approaches.

The experimental tasks used by Witkin involve the identification of figures in a complex background of Embedded Figures Tests.Alternatively a rod and frame experimental task could be used in which subjects have to discriminate between angles of the rod and frame.

In the embedded figures tests it was observed that some subjects could pick out hidden figures immediately whereas others could not. The former ability is called field independence and the latter is described as field dependence.

Field independents analyse and structure information presented to them whereas field dependents take in impressions about the information. Witkin is interested in the educational implications of the approaches and he discusses how field dependents tend to have personality traits like high sociability and which attract them to Arts rather than Sciences type courses at university.

The suggestion is that field independents tend towards science and mathematics type courses but, unlike the field dependents, could equally well succeed in arts subjects.

Another implication considered by Witkin is that concerning the need to match learning approaches with lecturing styles. He believes that field independent lecturers are more likely to present their subjects in a formal and structured way. The implication is that field dependent students might profit more from being taught by field independent lecturers because these students are less likely to be able to structure the information for themselves.

Witkin additionally believes that whilst there is no empirical evidence to substantiate the proposition, there is a suggestion from ancedotal experience to suggest that students prefer being taught by lecturers with styles similar to their own. This might be taken as an indication that there is a conflict between styles of lecturing students prefer and styles which are considered best for them.

4.8 Convergence And Divergence (Hudson, 1966)

Hudson (1966) describes two approaches of preferred thinking styles which he identifies as *divergent* and *convergent*. The former approach is characterised by a wide focus in perspective and by the inter-connecting of ideas. The latter approach is more narrowly focused and limited.

Hudson recognises that there are differences between individuals in the predominance of the one or other style of thinking and this is sufficient enough, he feels, to define convergent and divergent types.

The experimental research follows the impetus by Guilford (1950) who had distinguished between test performance of students whose thinking is said to be *open ended* and those whose thinking is seen as *closed*. The subsequent publication of tests to measure degrees of open endedness (Getzels and Jackson, 1962) led to results indicative of convergence and divergence being separate psychological processes.

Two commonly used tests in the early research are the *Uses Of Objects Test* and the *Word Association Test*, with the *Torrence Tests of Creativity* following. Hudson (1966) found differences in students performance on the first test mentioned above, even when the students had the same level of measured intelligence.

The divergers are those students who appeared to have more unusual uses for objects which are also more original and more varied.

Hudson believes that the preference for the one or other style of thinking has its origins in early childhood and is predisposed by school age. The tendency is for styles to create mythologies about arts types and sciences type courses which influences childrens' subsequent academic direction. The actual as opposed to the perecieved differences in styles becomes accentuated.

In this way, science faculty students become more convergent and arts faculty students become more divergent through a process of students self selectively entering the faculties.

Hudson has shown that pupils perceive arts and sciences as distinct academic groups from entering comprehensives. In his series of small scale studies he identifies what he calls a *mythology of arts and sciences* which involves the perception of scientists as hard workers and unsociable and less creative than arts types.

The beginings of a self selective student group then occurs with pupils opting for subjects matching preferred style. Support is provided by Roe (I953) whose interview data of scientists' self reported accounts suggests that pupils' early child rearing experiences develop choices of specialisms either involving people or avoiding interaction with people.In the case of the convergent scientists, the preference is for working without being involved with other people.

Hutchings (I975, p. 2) also gives some support for this :

"The scientists differ most significantly in being more intelligent more dominant, more tough minded, more self sufficient and more controlled. They are also markedly less demonstrative rather than excitable and more individualistic and reflective."

A major criticism of Hudson's research is suggested by Entwistle (I983) who says that looking at the dominant mode of thinking in students ignores the level of their thinking.

An implication of this criticism is that the studies showing students with high levels of measured intelligence (for example with IQ I20 and above) and high levels of measured convergence shown in creativity test scores (for example of I40 and above) assume the same predominance of style as in the case of students with low levels of measured intelligence (IQ I00) and low creativity (scores of I20).

In actual fact the level of creativity in the low ability student sample would probably be very different although the ratio between the convergent and divergent scores is the same. Entwistle argues that if comparative performance in analytic and imaginative thinking is to be the means of identifying presominant style, more than two categories are needed to accommodate the differences between those with high scores on both, low scores on both, and those with one high and one low score.

This becomes a description of ability rather than strategy. Entwistle (I983) concludes that the terminology of strategies or styles, in this instance can distinguish only between modes of thinking amoung students of similar intellectual abilities.

Comment and Discussion

These studies of learning strategies, variously defined, have methodological and substantive differences but also some similarity.

The similarity exists between those studies which (I) emphasise the processes of thinking and so focus on performance, and, (2) those studies which emphasise the products of thinking and focus on learning outcomes.

The Witkin (I976, I977), and Hudson (I966), and Kagan (I964) studies infer learning strategies to be responsible for differences identified in learning outcomes. They do not directly observe the strategies themselves but rather attribute them retrospectively to the type of outcome produced.

Alternatively, the Pask and Scott (I976) and the Bruner et al (I956) studies have in commom the objective of making observable the strategies of thinking used in learning processes.

Substantively the studies differ in the dimensions identified but certain conceptual similarities are apparent. For example there are parallels between the holism and serialism described by Pask and Scott and the wholism and partism described by Bruner. In the same way, parallels can be suggested between the personality correlates associated with Hudson's convergent and divergent styles and the impulsivity and reflectivity described by Kagan.

With exception, some similarity is seen too in the researchers enthusiasm to draw implications for practice from their research results. The study least explicitly concerned with educational implications is that of Bruner, Goodnow and Austin (1956).

Similarity can additionally be claimed to exist in the research design of the studies which is experimental and which involves the use of artificial tasks. Although acknowledged to have methodological limitations, the use of artificial problems has the advantage of control and precision and of novelty for subjects.

The objectives of the research is to describe the manoeuvres or tactics adopted by students who are seen as strategists with some repertoire of behaviours that include choice. Choice is perceived as generating guesses or hypotheses and some of the studies are interested in the speed and accuracy with which these are made or with the availability of original and variable solutions.

Some repertoires are perceived as less efficient than others or less appropriate to certain kinds of task. If this is the case then learning strategies can be seen as correlates of academic achievement just as ability factors are.

Further, if these strategies can be demonstrated to take the form of individual predispositions as opposed to being generated exclusively by task requirements, an area of individual differences has been identified.

It seems to the present Study that the identification of strategies in students is important because the establishment of an existence of difference is itself the starting point of an enterprise aimed at defining what might be called *behavioural variables* of learning. Thinking and studying are ways of behaving and they are behaviours which students perform differently.

The present Study uses a parallel and original version of the Bruner et al 1956 Study's concept identification procedure to establish the existence of learning strategies in a student population and to examine the associated variables, if any, of these strategies.

The strategies observed and measured are those of focusing and scanning and the associated variables are both dispositional, cognitive and behavioural which are described as habits of studying.

CHAPTER FIVE : THE STUDY

*"If you want to make sense, I've learned,
you should never use the word 'should'
or 'ought' until after you've used the
word 'if'."*

(John Barth, The Floating Opera)

5.I Introduction

The Study examines the relationship existing between some cognitive, dispositional, behavioural and contextual variables of student learning.

Idiosyncratic opinion about how students learn has always existed. Lecturers tend towards preferred beliefs formulated from experience and sometimes predisposed by the personal characteristics of the lecturers themselves. The defining attribute of a belief is that it is not evidence based and a problem with it is that it can be wrong.

Apart from the possibility of wrong beliefs, those which are unsupported by evidence tend to generalise into stereotypes which can be useful shortcuts in conceptualisations but which can limit perceptions.

Beliefs which are evidence based are said to be rational and these require the establishment of research based information that is public and repeatable. Consensus of research opinion lifts beliefs above a level of speculation and idiosyncracy.

Speculation is a difficult beast to de-mythologise and just as the psychologist is reputed to have difficulty in persuading the old lady who had made up her mind to accept the facts, so the research psychologist might find resistence to the facts by lecturers.

That there is a need for rational beliefs about how students learn has been suggested in the introductory chapter of this Study. In summary it is suggested that the need occurs because beliefs constitute choices about how to teach and determine policies of diagnostic and remedial help for students. When wrong, these beliefs generate bad advice.

Additionally, the need occurs because students perceive and internalise lecturers' opinions about effective studying. Students perceiving a low emphasis on lecture notes and a high emphasis on ability will predictably take fewer notes in class and project as good an academic image as possible. Students who lack a good academic image to project and who have no confidence in a compensatory effect of good lecture notes, will predictably demonstrate a poorer performance.

The *evidence* established by the present Study is used to reject or support certain beliefs about studying and approaching learning in polytechnic students. In the context of research these beliefs are called hypotheses. The hypotheses of the Study are described in subsequent pages.

5.2 Research Design

The Study focuses on study habits and learning strategies in a sample of polytechnic students and it examines the relationships existing between these and other related variables of learning.

In the Study these are considered holistically but for the purpose of clear description the study is here presented as two sub studies. Fig. 2 is a simplified representation of the investigation into learning strategies; Fig. 3 is a simplified representation of the investigation into learning strategies, and, Fig. 4 is a simplified representation of how the sub studies inter-relate as a whole.

5.2.I Sub Study One : Study Habits

Reference to Fig. 2 shows how the research problem identified is that concerning the existence of measurable differences in the ways students, classified into groups on the basis of sex, type of course pursued and faculty membership, study in their first year.

Additional questions for investigation concern the existence of stability in study habits measured as consistency after the duration of one year, and the patterning of study habits with other individual difference variables.

The procedure for administering test materials is to blanket test all first year students on one degree and one non degree course within each of the three faculties. In the testing sessions, the verbal reasoning test is administered first and followed with the EPI. A second test session is used to administer the study habits inventory, SHEIK and this is followed with the University of London Questionnaire and the Rotter Scale of Internal-External Locus of Control.

The consistency of responses to the study habits inventory is established by a test and repeat test, after one year, in a sample of I72 students, drawn from the original sample population. These one hundred and seventy two students are representative of both Arts and Science courses.

Qualitative data on study behaviours is obtained by administering an open ended, one question questionnaire, designed on the basis of previous conversations with students. A sample population of I50 students is used, drawn from the original sample. The questionnaire is given out to the students in timetabled hours and students are additionally invited to participate in informal discussion of the responses. Verbal comments were noted down. The qualitative data serves as illustrative material for the Study and suggests, perhaps, a face value for the statistical data where it is supportive of findings.

5.2.2 Sub Study Two : Learning Strategies

Reference to Fig. 3 shows that the research problem identified is to establish that students adopt characteristically preferred strategies in concept identification tasks.

The procedure involves the design of a concept identification task which is adapted from one used by Bruner et al (1956). This is shown in Fig. 5 and it is a matrix of one hundred figures, embodying more than one concept.

The possible concepts embodied in the figures are generated from the presence of attributes and attribute values. There are three attributes and seventeen values, which are described in Fig. 6. Combinations of these generate the possibility of two hundred concepts, described in Fig. 7.

Students are given the matrix one at a time and instructed to guess the concept held in mind by the experimenter. No help other than a positive or a negative response to guesses is given.

5.2.3 The Whole : Study Habits And Learning Strategies

Reference to Fig. 4 suggests that the problem for the Study is to examine the association of learning strategies with study habits and other individual differences. The procedure is to classify students into groups identified as Focusers and Scanners, having eliminated those students for whom a clear preference is not apparent.

The relationship between the strategy types and personality or ability or performance variables is examined.

Fig. 3 Sub Study Two : Learning Strategies

Research Problem Are there identifiable differences between the learning strategies used in concept identification tasks?

Sample Drawn from Arts and Science Courses and comprising Males n = 76; Females n = 44; Total n = I20

Procedure Administer the strategy matrix and score responses on a response sheet

Analysis Determine the frequency of strategy types

Results And Discussion Present the strategy types emerging and the frequency with which they occur

Fig. 2 Sub Study One : Study Habits

Research problem

I. are there measurable differences in the study habits of students?

2. are study habits stable over time?

3. Do students with different study habits have associated individual differences?

Sample

Student population of n=620 classified into groups according to sex, type of course pursued and faculty membership. The sample is drawn from one degree course and one non degree course within each faculty.

Procedure

I. measure study habits

2. measure other variables in a fixed order

Analysis

Determine the statistical significance of differences by calculating means and standard deviations;

Use STATPK to calculate correlation coefficients.

Results and Discussion

Establish relationships, differences and trends between study habits and ability factors; study habits and dispositional factors; study habits and type of course pursued and faculty membership.

Fig. 4 Sub Study Three : Learning Strategies And Study Habits

Research Problem

Do preferred learning strategies relate
with other individual differences?

ie. (a) with combined study habits
(b) with extraversion and neuroticism
(c) with locus of control
(d) with ability measured as (i) A levels, and
(ii) IQ

Sample

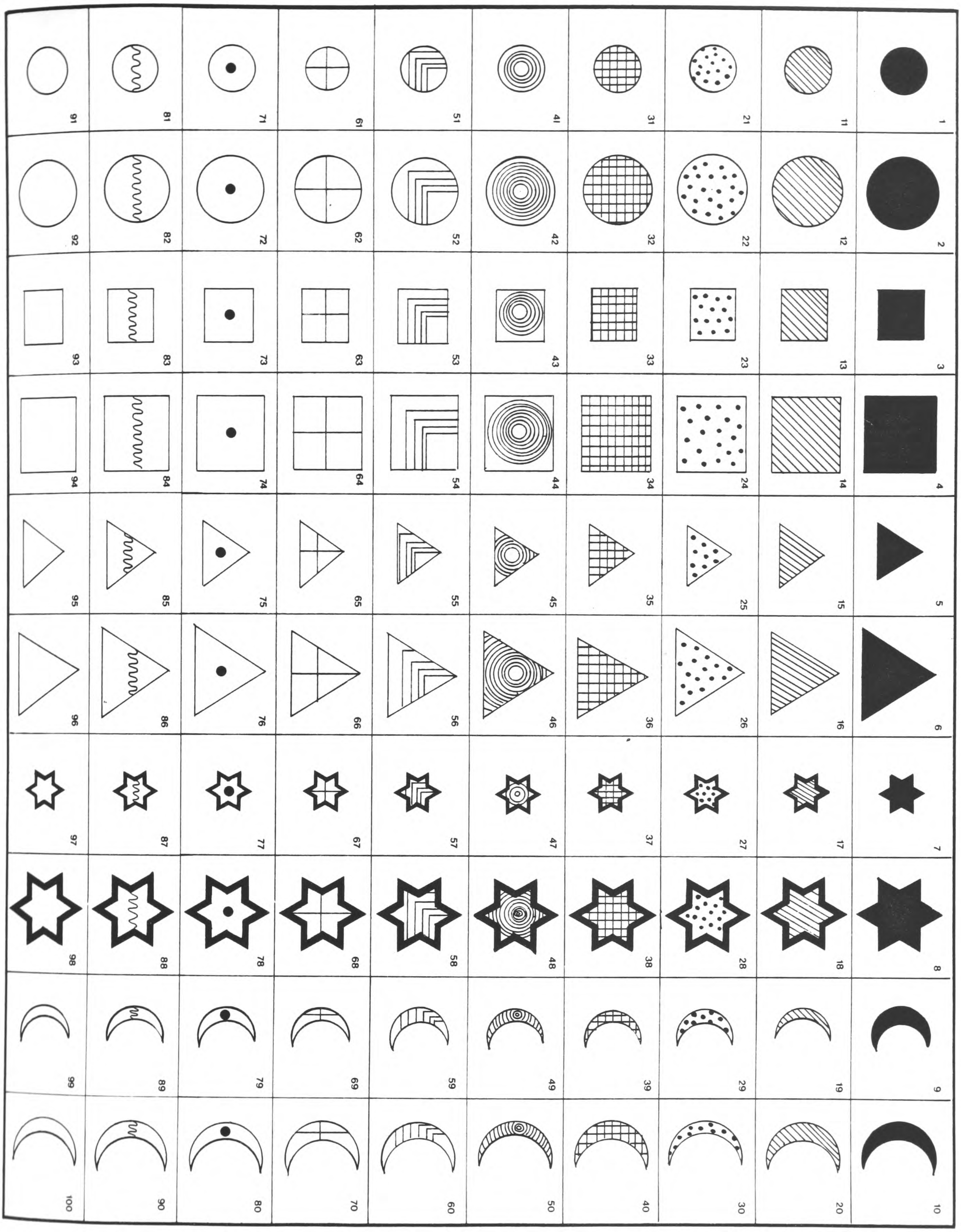
Drawn from Arts and Science Courses and comprising
n = I20

Analysis

Determine the frequency of associations
by calculating Chi sq.

Results And Discussion

Establish the existence of trends occurring between
strategies and cognitive variables described above



STRATEGY MATRIX

POLY/WALES/BEHAV SCI/EW/1981

Fig. 6 The Attributes And The Attribute Values Of The Concept Identification Matrix

Attributes :- (I) size (x2)
(2) shape (x5)
(3) pattern (xIO)

Attribute values :-

(I) circle (2) square (3) star (4) crescent
(5) triangle (6) big (7) small (8) black
(9) shaded (IO) dotted (II) crossed
(I2) ringed (I3) chevron (I4) checked
(I5) spotted (I6) curvy lined (I7) white

Fig. 7 The Concepts Embodied In The Matrix

one attribute concepts	two attribute concepts	three attribute concepts
I. small figure	I8. small black figure	98. small black circle
2. big figure	I9. small striped "	99. small striped "
3. circle	20. small dotted "	IOO. small dotted "
4. square	2I. small checked "	IOI. small ringed "
5. triangle	22. small ringed "	IO2. small chevron "
6. star	23. small chevron "	IO3. small crossed "
7. crescent	24. small crossed "	IO4. small spotted "
8. black figure	25. small spotted "	IO5. small curvy line "
9. stripe	26. small curvy line	IO6. small white circle
IO. dotted	27. small white figure	IO7. small black square
II. check	28. big black "	IO8. small striped "
I2. ringed	29. big striped "	IO9. small dotted "
I3. chevron	30. big dotted "	IIO. small checked "
I4. crossed	3I. big checked "	III. small ringed "
I5. spot	32. big ringed "	II2. small chevron "
I6. curvy line	33. big chevron "	II4. small crossed "
I7. white figure	34. big crossed "	II5. small spotted "
		II3. small checked circle

Fig. 7 Continued

two attribute
concepts

35. big spotted figure
36. big curvy lined "
37. big white "
38. black circle
39. striped circle
40. dotted circle
4I. checked circle
42. ringed circle
43. chevron circle
44. crossed circle
45. spotted circle
46. curvy line "
47. white circle
48. black square
49. striped "
50. dotted "
5I. checked square
52. ringed "
53. chevron square
54. crossed "
55. spotted "
56. curvy line "
57. white "
58. black triangle
59. striped "
60. dotted "
6I. checked "
62. ringed "
63. crossed "
64. chevron "
65. spotted "
66. curvy line "
67. white "
68. black star
69. striped star
70. dotted star
7I. checked star
72. ringed star
73. crossed star
74. chevron star
75. spotted star
76. curvy line "
77. white star
78. black crescent
79. striped "

three attribute
concepts

II6. small curvy line square
II7. small white square
II8. small black triangle
II9. small striped "
I20. small dotted "
I2I. small checked "
I22. small ringed "
I23. small chevron "
I24. small crossed "
I25. small spotted "
I26. small curvy line "
I27. small white "
I28. small black star
I29. small striped star
I30. small dotted star
I3I. small checked star
I32. small ringed star
I33. small chevron star
I34. small crossed star
I35. small spotted star
I36. small curvy line "
I37. small white star
I38. small white star
I39. small black crescent
I40. small striped "
I4I. small dotted "
I42. small checked "
I43. small ringed "
I44. small chevron "
I45. small crossed "
I46. small spotted "
I47. small curvy line "
I48. small white "
I49. small checked circle
I50. big black circle
I5I. big striped "
I52. big dotted "
I53. big checked "
I54. big ringed "
I55. big chevron "
I56. big crossed circle
I57. big spotted "
I58. big curvy line "
I59. big white "
I60. big black square

Fig. 7 Continued

two attribute concepts	three attribute concepts
80. dotted crescent	I6I. big striped square
8I. checked "	I62. big dotted square
82. ringed "	I63. big checked square
83. chevron "	I64. big ringed "
84. crossed "	I65. big chevron "
85. spotted "	I66. big crossed "
86. curvy line "	I67. big spotted "
87. white crescent	I68. big curvy line "
88. small circle	I69. big white square
89. big circle	I70. big black triangle
90. small square	I7I. big striped "
9I. big square	I72. big dotted "
92. small triangle	I73. big checked "
93. small star	I74. big ringed "
94. big triangle	I75. big chevron "
95. big star	I76. big crossed "
96. small crescent	I77. big spotted "
97. big crescent	I78. big curvy line "
	I79. big white triangle
	I80. big black star
	I8I. big striped star
	I82. big dotted star
	I83. big checked star
	I84. big ringed star
	I85. big chevron star
	I86. big crossed star
	I87. big spotted star
	I88. big curvy line "
	I89. big white star
	I90. big black crescent
	I9I. big striped "
	I92. big dotted "
	I93. big checked crescent
	I94. big ringed "
	I95. big chevron "
	I96. big crossed "
	I97. big spotted "
	I98. big curvy line "
	I99. big white crescent

5.3 The Sample

The sample is drawn from three faculties of The Polytechnic of Wales (Appendix). Originally the South Wales And Monmouthshire School of Mines, established in I9I3, the institution was recognised as a Regional College of Technology offering craft, technological and commercial courses in the post war years. When the idea of the polytechnics was first proposed in I965, plans were made to designate the institution as a polytechnic and these were realised on Ist April, I970.

During the I98I/2 academic year, when the present Study was initiated, there were approximately 3,250 full time and I, 200 part time students (Polytechnic of Wales Handbook, I982) in attendance. These are for both degree and non degree courses.

The Polytechnic is organised into three faculties called, the Faculty of Environmental Studies; Faculty of Engineering Studies, and Faculty of Professional Studies. Within each faculty exist four departments, with most offering one degree and one non degree course.

The sample population in the present Study comprises 620 first year students of both sexes from all three faculties, and representative of degree course and non degree courses. The sample for the longitudinal data on study habits stability comprises I72 students tested in their first and second years during the same term of the consecutive years. The sample used for the strategies data is I20, ambiguous strategies having been eliminated from the original sample size. The qualitative data is drawn from a student sample of I50 from different faculties.

5.4 Description Of Test Materials Used In The Study

5.4.I The SHEIK

The Study Habits Evaluation And Instruction Kit was developed by the Test Division Of The New Zealand Council for Educational Research (I979). The SHEIK consists of two parts; first the Inventory and its combined Response sheet and Marking key, and second, the instructional units.

The Inventory consists of seven, twenty five item, self report scales, each of which assesses a different aspect of studying. The Inventory is not a test in the sense of producing right and wrong answers but some responses are considered to be *better* than others because they reflect behaviours most typical of high achievers.

The combined Response sheet , Marking key and Profile sheet enable students to mark their own responses and to compare the results on each scale with each of the others and with a set of percentile scores.

The Inventory is administered to a group and takes about thirty minutes to complete althcugh there is no real time limit. It is a self administering Inventory and it has standardised, written instructions. Scoring and interpretation of scores is straitforward and done according to the Manual (I979).

5.4.2 The University Of London Questionnaire

The LUQ was designed by Crown, Lucas and Supramani (I973) to elicit affective and motivational factors contributing to study difficulty. It consists of seven sub scales, each one containing nine items.

The scales are : a. anxiety
b. obsessionality
c. depression
d. disorganised
e. low motivation
f. somatic
g. work satisfaction

Responses to the Questionnaire are scored according to a marking key. The scoring is a system of giving 0, I, or 2 marks for each response according to the instructions given by the Questionnaire designers. A composite score can be obtained if required.

The questionnaire is used in the present Study to obtain data on anxiety and motivation in the student sample. Although data on the remaining five sub scales was collected it is not utilised in the results and analysis of results.

5.4.3 The Moray House Verbal Reasoning Test (Adult)

The Moray House has been extensively used in research with student as well as with the general adult population (Manual (I970). It comprises I00 items, varying in nature and complexity. The revised I970 version enables reasoning quotients to be derived from the raw scores. The authors of the revised test point out that their test's reasoning quotient resembles the intelligence quotient of the Binet and Stanford Binet Intelligence Scale quotients in its numerical distribution, but that it differs in not being arrived at through any consideration of mental age.

Subjects tested on the Moray House are assessed by considerations of their standing in a representative group of people as described in the Manual (I970). Marking is done according to clearly described instructions.

5.4.4 The EPI

The Eysenck Personality Inventory recognises two dimensions of personality (Eysenck and Eysenck, I970). These are described as a Neuroticism dimension which is seen as a continuum of stability and instability, and Extraversion - Introversion as a second dimension.

Neuroticism indicates a person's arousal potential and a highly neurotic individual is described as over responsive and likely to break down under stress. Extraversion indicates a sociable, carefree and impulsive individual, opposite to the Introvert characteristics of withdrawn, introspective and inhibited people.

These personality dimensions are perceived to be orthogonal which means that they show no correlation or tendency for a score on the one to be related to scores on the other.

The Extraversion Scale represents a continuum of extraversion-introversion on which high scores indicate extraversion. The Neuroticism Scale represents a dimension of emotional stability on which high scores reflect emotional instability, anxiety, feelings of moodiness and restlesness. Low scores indicate a stable individual who is calm, even tempered and controlled.

The Lie Scale is a validity measure which identifies the extent to which subjects are likely to give false accounts of themselves. Eysenck (1976) has said that, "*The tendancy to have a high lie score may be in itself an interesting personality trait*". High reliability and validity are reported for the Inventory (Gibson, 1962).

5.4.5 Locus of Control

The Locus of Control Scale (Rotter, 1966) can be described as a self appraisal of the degree to which individuals view themselves as having causal roles in determining their life courses.

It is a twenty nine item questionnaire which asks for a response to be made to paired stimulus questions. Certain responses are scored and totalled to give an Externality measurement.

Instructions given by the Scale indicate that it is measuring the way in which certain important events in society affect different people.

Subjects are asked to select the paired alternative in each question that they most strongly believe to be the case and to indicate their response with an "x". The Scale takes approximately five minutes to administer and it is simply scored. High scores indicate externality.

5.4.6 Academic Self Concept Scale

The Brookover Academic Self Concept Scale (Brookover et al, I967) measures self image in a specifically academic, as opposed to social, context.

The form of the Scale used in the present Study is a shorter version of the original Brookover Scale which has been anglicised with small minor alterations in the wording of three items. It consists of six (instead of eight) multiple choice items, scored 5 to I. The higher self concept alternatives receive the higher values.

Each item requires the subject to compare himself with others on the dimensions of academic ability in an expanding system of social relationships, beginning with immediate peer group and moving out beyond the classroom situation.

In a longitudinal study (Brookover, I967) self concept of ability was found to be significantly associated with academic achievement at every grade level. Changes in self concept were parallel with changes in actual academic achievement.

It has been used in research investigative studies (Cohen and Cohen, 1974). The Scale takes approximately ten minutes to administer and is simply scored by adding the weighted responses.

5.5 The Hypotheses

The null hypotheses of the Study are as follows :

5.5.I. Null hypothesis one

No significant differences in intelligence, extraversion, neuroticism, locus of control, A levels, motivation, anxiety, academic self concept time spent studying and combined study habits, exist between the sexes (a) for the total sample, (b) within faculties, and, (c) for degree course and non degree course students.

5.5.2 Null hypothesis two

No significant differences in intelligence, extraversion, neuroticism, locus of control, A levels, anxiety, motivation, academic self concept, time spent studying and combined study habits, exist between the faculties for (a) the total sample, (b) sub groups with sex held constant, and, (c) sub groups with sex and type of course pursued held constant.

5.5.3 Null hypothesis three

No significant differences in intelligence, extraversion, neuroticism, locus of control, A levels, anxiety, motivation, academic self concept, time spent studying and combined study habits, exist between degree course and non degree course students for (a) the total sample, (b) within faculties, and, (c) sub groups within the faculties with sex held constant.

5.5.4 Null hypothesis four

No significant differences exist between the females and males in each faculty for performance on the various sub tests of study habits.

5.5.5 Null hypothesis five

No significant differences exist between (a) students of different faculties on the sub tests of study habits and between (b) students of different faculties classified according to type of course pursued.

5.5.6 Null hypothesis six

Within the faculties, there are no significant mean differences between degree course and non degree course students on the sub tests of study habits.

5.5.7 Null hypothesis seven

No significant differences exist between students tested initially and after a period of one year on the various sub tests of study habits.

5.5.8 Null hypothesis eight

No significant relationships exist between students' initial scores on various sub tests of study habits and their later scores on the same sub tests after a period of one year.

5.5.9 Null hypothesis nine

No significant relationships exist between combined study habits and the variables of intelligence, extraversion, neuroticism, locus of control, A levels, anxiety, motivation, academic self concept, time spent studying and examination performance for (a) the total sample of degree course and non degree course students, (b) the sexes pursuing different types of courses, and, (c) every faculty group of students, and, (d) the sexes within each faculty.

5.IO Null hypothesis ten

No signifiicant relationship exists between individual study habits and the variables of intelligence, extraversion, neuroticism, locus of control, A levels, anxiety, motivation, academic self concept, time spent studying for (a) students pursuing different types of courses, (b) male and female students pursuing different types of courses, irrespective of faculty membership.

5.II Null hypothesis eleven

No significant relationships exist between individual study habits and examination performance for (a) degree course and non degree course students classified as male and female, (b) all degree course and all non degree course students, (c) all male and female students, (d) all male and female students within each faculty, and, (e) the total sample of students.

5.I2 Null hypothesis twelve

No significant differences for frequencies of types of examination performance occur for (a) students classified according to sex and type of course pursued, (b) students classified according to sex and type of course pursued and scores above and below the medians for combined study habits.

5.5.13 Null hypothesis thirteen

No significant differences in performance on tests of study habits neuroticism, extraversion, academic self concept, intelligence and A levels exist between students classified as focusers and scanners on a concept matrix test.

5.6 Description of The Study

5.6.I Aims

The aims of the Study can be described as taking the form of research problems. These research problems for investigation are :

(I) The question of whether measurable differences in students' study habits exist.

(2) The problem of stability of study habits and whether test-retest scores after a period of one year show variation.

(3) The questionof whether study habits are associated with other individual difference characteristics like personality and ability.

(4) The question of whether measurable differences in students' learning strategies on concept identification tests exist.

(5) The problem of whether students' learning strategies are associated with differences in study habits and personality and ability.

This description of aims as research problems suggests the appropriateness of psychometric instruments for data collection and quantitative data analysis. However, a further aim of the Study which relates to the first research problem identified above is the observation of students' self reported methods of studying and their attributions concerning the importance of study habits as variables in academic achievement. This can be stated as a sixth type of research problem and it is described as :

(6) The description of students' self reported habits of studying and students' attribution of academic achievement.

The administration of test materials and the compilation of data is described under the sub heading of *Quantitative Description*. The account information is described under the sub heading of *Qualitative Description*.

5.6.2 Administration of Test Materials For The Quantitative Data

5.6.2.I. Study Habits

The procedure is to administer a study habits inventory to a total sample of 620 first year students. The inventory used is the Study Habits Evaluation and Instruction Kit (SHEIK). This is followed by the administration of The University of London Questionnaire which measures anxiety and motivation, and the Rotter Scale of Internal and External Locus of Control which measures expectations of how far actions can be instrumental in bringing about change. These scales are preceded by the Moray House Verbal Reasoning Test which measures intelligence, and the Eysenck Personality Inventory (EPI) which measures extraversion and neuroticism. The order of testing is invariable.

The administration of tests is carried out in the Autumn Term of the first year for all students in the sample. The two sessions needed for firstly, the intelligence and personality testing, and secondly, for the study habits, anxiety, motivation and locus of control scores are spaced a week apart.

5.6.2.2 Learning Strategies

The procedure is to administer a concept matrix test, developed by the present Study and adapted from one used by Bruner et al (1956). The matrix is administered to students in small groups, usually numbering ten. Individual students are instructed to examine the possible concepts embodied in the figures of the matrix and from selections of attributes or whole concepts to solve the problem of what concept the experimenter has in mind.

The actual instruction used is :

"Figure ( ) is an example of the concept I have in mind."

The procedure utilises the selection mode of presenting information because the students select which examples they use to test out hypotheses about solution. Responses are recorded on an answer sheet.

The scoring of responses recorded on the answer sheets follows the criteria specified in the 1956 Study. In crude terms, those students who, *"Pick a card (*ie. figure*) and use it as a home base or focus ... then make choices varying one feature at a time "*, are identified as focusers.

The scanners, on the other hand, are identified from their tendency to, *"Eliminate whole hypotheses rather than attributes."*

The distinctive tendancy is that some students will gamble on a small amount of information while others will play safe and even use redundant information to confirm and confirm again their hypotheses. In specific terms, the focusing strategy is identified from responses selecting one or two attributes to test out the relevance of an hypothesis. For example, a focuser will typically ask whether a figure qualifies as a positive instance of the concept held in mind by the experimenter and on the basis of the experimenter's response will eliminate certain attribute values and proceed to test further those remaining. A scanner will not typically do this but instead test out the whole thing with a, *"Is it square shape?"* type guess.

An illustration of this is as follows :

Example

Experimenter : *"Figure no. 39 is a positive example of the concept."*

Student : *"Is no. 25 an example?"*

Experimenter : *"No."*

Student : *"The pattern is different and so pattern must be important."* (Hypothesis I)

"Both the shape and pattern are different and so both might be important." (Hypothesis 2)

These two hypotheses represent different procedures, or strategies, to solution. Which ever one is used, the only figures worth testing are those with something in common with the initial example. Every selection must have at least one attribute value that is the same.

The possibilities of solution from this example of figure no. 39 being a positive instance of the experimenter's concept are as follows :

Exemplar : *39*

Possibilities : *checked fig.; crescent fig.; small fig.; small checked crescent; small checked fig.; small crescent; checked crescent.*

The selection patterns which could emerge from this are summarised below :

First selection pattern

The student uses every instance to decide which concepts are still possible. The question becomes one of, *"Is the concept 'checked figure?'"*. There seem to be two ways in which the remaining possibilities can be tested.

I. Check one possibility as in, *"Is no. 29 an example?"* (The hypothesis is that of crescent figure).The negative response from the experimenter leads to, *"It can't be 'crescent', I'll try 'small figure'"*. This leads to, *"Is no. 55 an example?"*. *"No, then it can't be 'small figure'"*.

2. Check which concepts are possible by eliminating a few hypotheses together when examining selections. Questions are like, *"Is no. 29 an example? No, then it can't be 'small figure', 'crescent', or 'small crescent'"*.*"Is no. 35 an example? Yes, then it might be 'small figure', 'checked figure', 'small checked figure'. Is no. 3I an example? Yes, then it must be 'checked figure'"*.

Second selection pattern

The student uses selections to decide which attribute values are important. The question becomes one of, *"Is check important?"*. There seem to be two ways in which the possibilities can be tested.

I. Check one attribute at a time as in, *"Is pattern important?"*.

2. Check a few attributes together as in, *"Are pattern & shape important?"*.

Bruner *et al* (1956) identifies the first selection procedure as that of scanning, and the two ways of testing the possible concepts are described as successive scanning and simultaneous scanning. The second selection pattern is identified as focusing and the two ways of testing the attributes of the concept are described as conservative focusing and focus gambling.

The present Study eliminates those ambiguous, or difficult to distinguish, strategies from its sample. The differentiation between the remaining strategies into focusing and scanning is not problematic but the sub divisions of the categories, suggested by Bruner, is methodologically more difficult and the present Study uses the general classes only.

5.6.2.3 Study Habits and Learning Strategies

The relationship between combined study habits and the variable of the type of strategy preferred is examined, as is the relationship between intelligence, extraversion, neuroticism, academic self concept, and A levels, respectively with the type of strategy preferred.

The statistical tests employed in the Study are as follows, and further details about them are given in Appendix A.

(a) "t" tests for independent and correlated means; (b) the product moment test of correlation; (c) the X^2 test; (d) a principal components factor analysis leading to a variomax rotational analysis.

5.7 Results

"I must confess that a man is guilty of unpardonable ignorance who concludes that because an argument has escaped his own investigations that it therefore does not really exist."

(Hume, 1711–1776)

RESULTS RELATING TO DIFFERENCES AND RELATIONSHIPS BETWEEN GROUPS, CLASSIFIED ACCORDING TO SEX

NULL HYPOTHESIS ONE, stated that :

No significant differences in intelligence, neuroticism, extraversion, locus of control, A levels, anxiety, academic self concept, time spent studying and combined study habits, exist between the sexes for (a) the total sample, and, (b) within the faculties, and, (c) degree and non degree course students.

Table I. Test Variables' Means, Standard Deviations, Mean Differences And "t" Values For Females And Males Of The Total Sample

Test Variable	Females (n=171)		Males (n=449)		Mean Diff.	't'	Sig. Level
	Mean	SD	Mean	SD			
Intelligence	114.50	12.09	111.00	12.67	3.50	3.18	0.01
Extraversion	13.20	4.37	12.79	3.67	0.59	1.56	NS
Neuroticism	11.40	4.83	10.23	4.17	1.17	2.80	0.01
Locus of C.	12.98	3.19	12.16	3.48	0.82	0.28	NS
A levels	3.25	2.86	2.44	2.22	1.17	0.81	0.001
Anxiety	6.34	4.37	6.62	3.49	0.28	0.75	NS
Motivation	7.57	3.70	7.52	3.49	0.05	0.15	NS
Academic S.C.	1.18	0.39	1.15	0.36	0.03	0.94	NS
Time	18.85	8.50	18.23	8.49	0.62	0.81	NS
Combined S.H.	192.80	35.67	187.40	37.67	5.40	1.66	NS

Table 2. Test Variables' Means, Standard Deviations, Mean Differences And "t" Values For Females And Males Pursuing Degree Courses And Non Degree Courses, Irrespective Of Faculty Membership

Course	Test Variable	Females (n=126)		Males (n=292)		Mean Diff.	't'	Sig. Level
		Mean	SD	Mean	SD			
Degree n = 418	Intelligence	114.23	11.08	113.10	12.02	1.13	0.92	NS
	Extraversion	12.89	4.39	12.61	3.51	0.27	0.61	NS
	Neuroticism	11.51	4.93	10.21	4.06	1.30	2.60	0.01
	Locus of C.	12.94	3.31	12.10	3.68	0.84	2.30	0.05
	A levels	3.86	6.12	3.02	2.36	0.84	1.49	NS
	Anxiety	6.41	3.98	6.62	3.42	0.21	0.52	NS
	Motivation	7.48	3.81	7.57	3.59	0.09	0.23	NS
	Academic S.C.	1.17	0.38	1.16	0.37	0.01	0.25	NS
	Time	19.25	7.98	19.08	8.77	0.77	0.19	NS
	Combined S.H.	197.62	36.41	188.36	40.81	9.26	2.30	0.05
Course	Test Variable	Females (n=45)		Males (n=157)		Mean Diff.	't'	Sig. Level
		Mean	SD	Mean	SD			
Non-Degree n = 202	Intelligence	115.31	14.69	107.39	13.07	7.92	3.27	0.01
	Extraversion	14.07	4.24	13.14	3.95	0.93	1.39	NS
	Neuroticism	11.09	4.59	10.28	4.37	0.81	1.06	NS
	Locus of C.	13.11	2.85	12.28	3.06	0.83	1.69	NS
	A levels	1.54	2.30	1.36	1.39	0.15	0.42	NS
	Anxiety	6.16	5.38	6.62	3.64	0.45	0.53	NS
	Motivation	7.80	3.41	7.43	3.31	0.37	0.66	NS
	Academic S.C.	1.20	0.40	1.12	0.32	0.08	1.23	NS
	Time	17.76	9.82	16.64	7.72	1.12	0.71	NS
	Combined S.H.	179.20	29.90	185.73	31.04	6.53	1.28	NS

Table 3. Test Variables' Means, Standard Deviations, Mean Differences And "t" Values For Females And Males In Different Faculties, Irrespective Of Type Of Course Pursued

Faculty	Test Variable	Females		Males		Mean Diff.	't'	Sig. Level
		Mean	SD	Mean	SD			
1	Intelligence	119.00	12.35	112.90	13.70	6.10	2.10	0.05
	Extraversion	12.90	3.82	12.29	3.78	0.79	0.89	NS
	Neuroticism	11.57	4.33	10.02	3.95	1.55	1.56	NS
Female n = 21	Locus of C.	12.00	3.02	12.94	3.31	0.17	0.33	NS
	A levels	2.19	2.85	2.17	2.04	0.02	0.19	NS
	Anxiety	8.09	7.38	7.05	3.61	1.04	0.64	NS
	Motivation	7.00	3.41	7.46	3.69	0.46	0.58	NS
Male n = 160	Academic S.C.	1.00	0.00	1.01	0.30	0.10	4.17	0.001
	Time	20.38	7.96	18.74	9.90	1.64	0.86	NS
	Combined S.H.	196.90	40.24	189.10	38.95	7.80	0.84	NS
2	Intelligence	114.40	11.71	111.30	10.38	3.10	2.30	0.05
	Extraversion	13.45	4.49	13.21	3.96	0.24	0.46	NS
	Neuroticism	11.65	4.94	10.59	4.63	1.06	1.81	NS
Female n = 130	Locus of C.	13.27	3.28	12.49	3.42	0.72	1.76	NS
	A levels	3.35	6.15	2.39	2.14	0.96	1.69	NS
	Anxiety	5.86	3.70	5.73	3.06	0.13	0.31	NS
	Motivation	7.56	3.73	7.31	3.61	0.35	0.78	NS
Male n = 140	Academic S.C.	1.21	0.41	1.18	0.38	0.03	0.62	NS
	Time	17.61	7.73	15.81	6.80	1.80	2.02	0.05
	Combined S.H.	191.90	33.22	179.20	34.50	12.70	3.08	0.01
3	Intelligence	110.45	13.28	108.89	13.23	1.56	0.49	NS
	Extraversion	11.90	4.64	12.95	3.21	1.05	0.98	NS
	Neuroticism	9.65	4.64	10.12	3.94	1.47	1.35	NS
Female n = 20	Locus of C.	12.55	2.58	12.05	3.49	0.50	0.78	NS
	A levels	3.70	2.23	2.77	2.43	0.93	1.73	NS
	Anxiety	7.60	3.80	6.99	3.62	0.61	0.68	NS
	Motivation	8.20	3.93	7.88	3.14	0.32	0.35	NS
Male n = 149	Academic S.C.	1.15	0.37	1.18	0.39	0.03	0.34	NS
	Time	25.30	10.84	19.95	7.78	5.35	2.13	0.05
	Combined S.H.	193.55	38.03	193.42	46.50	0.13	0.12	NS

Table 4. Test Variables' Means, Standard Deviations, Mean Differences And "t" Values For Females And Males In Different Faculties, Pursuing Degree Courses

Faculty	Test Variable	Females		Males		Mean Diff.	't'	Sig. Level
		Mean	SD	Mean	SD			
1	Intelligence	123.10	7.57	117.32	12.65	5.78	2.28	0.05
	Extraversion	12.75	3.56	12.17	3.47	0.58	0.53	NS
	Neuroticism	11.50	4.66	9.73	3.92	1.77	1.26	NS
Female n = 12	Locus of C.	12.33	3.58	12.10	3.81	0.23	0.21	NS
	A Levels	2.58	2.23	2.55	2.34	0.03	0.04	NS
	Anxiety	7.66	3.08	7.29	3.38	0.37	0.39	NS
	Motivation	7.00	3.79	7.71	3.80	0.71	0.61	NS
Male n = 98	Academic S.C.	1.00	0.00	1.12	0.33	0.12	3.80	0.001
	Time	21.00	9.46	19.86	11.35	1.14	0.39	NS
	Combined S.H.	203.80	46.95	186.50	44.51	17.30	1.21	NS
2	Intelligence	113.61	10.57	110.00	10.90	3.61	2.28	0.05
	Extraversion	13.06	4.54	13.25	3.91	0.19	0.30	NS
	Neuroticism	11.85	4.98	10.71	4.54	1.14	1.63	NS
Female n = 96	Locus of C.	13.09	3.39	12.15	3.54	0.94	1.84	NS
	A Levels	4.01	6.90	3.01	2.12	1.00	1.35	NS
	Anxiety	6.04	4.05	5.42	3.04	0.62	1.18	NS
	Motivation	7.43	3.79	7.18	3.94	0.25	0.44	NS
Male n = 89	Academic S.C.	1.20	0.04	1.21	0.41	0.01	0.16	NS
	Time	18.13	7.16	16.39	6.59	1.74	1.73	NS
	Combined S.H.	197.97	32.48	184.52	36.18	13.45	2.65	0.01
3	Intelligence	111.67	13.28	111.74	11.29	0.07	0.02	NS
	Extraversion	12.11	4.24	12.47	3.10	0.36	0.35	NS
	Neuroticism	9.72	4.66	10.22	3.74	0.50	0.42	NS
Female n = 18	Locus of C.	12.50	2.71	12.06	3.73	0.44	0.60	NS
	A Levels	3.94	2.21	3.46	2.49	0.48	0.84	NS
	Anxiety	7.56	3.88	7.01	3.52	0.55	0.56	NS
	Motivation	8.11	4.09	7.76	3.04	0.35	0.35	NS
Male n = 105	Academic S.C.	1.16	0.38	1.17	0.38	0.01	0.10	NS
	Time	24.06	9.51	20.64	6.99	3.42	1.46	NS
	Combined S.H.	191.70	48.60	193.40	40.80	1.70	0.14	NS

Table 5. Test Variables' Means, Standard Deviations, Mean Differences And "t" Values For Females And Males In Different Faculties Pursuing Non Degree Courses

Faculty	Test Variable	Females Mean	Females SD	Males Mean	Males SD	Mean Diff.	't'	Sig. Level
1	Intelligence	113.67	15.67	106.10	12.49	7.57	1.39	NS
	Extraversion	13.11	4.37	12.47	4.24	0.64	0.41	NS
	Neuroticism	11.66	4.12	10.47	3.99	1.19	0.81	NS
Female	Locus of C.	11.55	2.19	11.79	3.04	0.24	0.29	NS
n = 9	A Levels	1.68	1.26	1.58	1.22	0.10	0.22	NS
	Anxiety	8.67	11.06	6.66	3.94	2.01	0.54	NS
	Motivation	7.00	3.04	7.05	3.51	0.05	0.04	NS
Male	Academic S.C.	1.00	0.00	1.06	0.25	0.06	1.90	NS
n = 62	Time	19.56	5.85	16.97	6.75	2.59	1.10	NS
	Combined S.H.	187.80	29.20	193.20	27.85	5.40	1.15	NS
2	Intelligence	116.70	14.42	113.53	9.07	3.17	1.14	NS
	Extraversion	14.56	4.23	13.14	4.09	1.42	1.54	NS
	Neuroticism	11.06	4.84	10.39	4.82	0.67	0.63	NS
Female	Locus of C	13.53	2.96	13.28	3.14	0.25	0.37	NS
n = 34	A Levels	1.50	2.39	1.29	1.72	0.21	0.51	NS
	Anxiety	5.38	2.41	6.27	3.06	0.89	1.49	NS
	Motivation	7.94	3.58	7.27	2.98	0.67	1.02	NS
Male	Academic S.C.	1.26	0.45	1.12	0.33	0.14	1.57	NS
n = 51	Time	16.18	9.09	14.80	7.10	1.38	0.76	NS
	Combined S.H.	175.03	29.60	169.90	29.40	5.13	0.78	NS
3	Intelligence	99.50	9.19	102.10	15.06	2.60	0.38	NS
	Extraversion	10.00	0.00	14.09	3.19	4.09	8.51	0.001
	Neuroticism	9.00	2.80	9.89	4.42	0.89	0.43	NS
Female	Locus of C.	13.00	1.41	12.05	2.89	0.95	0.86	NS
n = 2	A Levels	1.50	0.70	1.14	1.17	0.36	0.68	NS
	Anxiety	8.00	4.25	6.93	3.88	1.07	0.35	NS
	Motivation	9.00	2.83	8.16	3.37	0.84	0.41	NS
Male	Academic S.C.	1.00	0.00	1.20	0.41	0.20	3.17	0.01
n = 44	Time	36.50	20.51	18.32	9.29	18.18	1.25	NS
	Combined S.H.	210.50	19.09	193.50	30.09	17.00	1.19	NS

RESULTS RELATING TO DIFFERENCES AND RELATIONSHIPS BETWEEN GROUPS OF STUDENTS, CLASSIFIED ACCORDING TO FACULTY MEMBERSHIP

NULL HYPOTHESIS TWO, stated that :

No significant differences in intelligence, extraversion, introversion, locus of control, A levels, anxiety, academic self concept, motivation, time spent studying and combined study habits, exist between the faculties for (a) the total faculty samples, and, (b) sub groups with sex held constant, and, (c) sub groups with sex and type of course pursued held constant

Table 6. Test Variables' Means And Standard Deviations For Faculties I and 2 and 3, Irrespective Of Sex And Type Of Course Pursued

Test Variable	Faculty 1 (n=181)		Faculty 2 (n=270)		Faculty 3 (n=169)	
	Mean	SD	Mean	SD	Mean	SD
Intelligence	113.70	13.70	112.80	11.13	109.08	13.20
Extraversion	12.36	3.78	13.33	4.22	12.82	3.32
Neuroticism	10.20	4.02	11.10	4.80	10.06	3.99
Locus of C	11.98	3.46	12.83	3.37	12.11	3.39
A Levels	2.17	2.97	2.85	4.55	2.88	2.42
Anxiety	7.17	4.20	5.79	3.38	7.06	3.63
Motivation	7.40	3.66	7.38	3.67	7.92	3.23
Academic S.C.	1.09	0.28	1.19	0.39	1.18	0.38
Time	18.93	9.70	16.68	7.30	20.59	8.34
Combined S.H.	190.00	39.06	185.35	34.40	193.43	38.97

Table 7. Mean Test Differences Between Faculties, "t" Values And Significance Levels *(Data derived from Table 6)*

Test Variable	Faculty 1 v 2			Faculty 1 v 3			Faculty 2 v 3		
	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level
Intelligence	+0.90	0.74	NS	+4.62	3.21	0.01	+3.72	3.05	0.01
Extraversion	-0.97	2.55	0.02	-0.46	1.21	NS	+0.51	1.41	NS
Neuroticism	-0.90	2.16	0.05	+0.14	0.33	NS	+0.94	2.22	0.05
Locus of C.	-0.85	2.59	0.01	-0.13	0.36	NS	+0.72	2.17	0.05
A Levels	-0.68	1.89	NS	-0.71	0.88	0.05	-0.03	0.90	NS
Anxiety	+1.38	3.80	0.001	+0.11	0.26	NS	-1.27	3.67	0.001
Motivation	+0.02	0.06	NS	-0.52	1.41	NS	-0.54	1.61	NS
Academic S.C.	-0.10	3.16	0.01	-0.09	0.83	NS	+0.01	0.07	NS
Time	+2.25	2.66	0.01	-1.66	1.72	NS	-3.91	5.01	0.001
Combined S.H.	+4.65	1.30	NS	-3.43	0.82	NS	-8.08	2.21	0.05

Table 8. Test Variables' Means And Standard Deviations For Males In Faculties I and 2 and 3, Irrespective Of Sex And Type Of Course Pursued

Test Variable	Faculty 1 (n=160)		Faculty 2 (n=140)		Faculty 3 (n=130)	
	Mean	SD	Mean	SD	Mean	SD
Intelligence	112.90	13.70	111.30	10.38	108.89	11.71
Extraversion	12.29	3.78	13.21	3.96	12.95	3.21
Neuroticism	10.02	3.95	10.59	4.63	10.12	3.94
Locus of C.	11.98	3.52	12.49	3.42	12.05	3.49
A Levels	2.17	2.04	2.39	2.14	2.77	2.43
Anxiety	7.05	3.61	5.73	3.06	6.99	3.62
Motivation	7.46	3.69	7.21	3.61	7.88	3.14
Academic S.C.	1.10	0.30	1.18	0.38	1.18	0.39
Time	18.74	9.90	15.81	6.80	19.95	7.78
Combined S.H.	189.10	38.95	179.20	34.50	193.42	38.03

Table 9. Mean Test Differences Between Males In Faculties I and 2 and 3, "t" Values And Significance Levels *(data derived from Table 8)*

Test Variable	Faculty 1 v 2			Faculty 1 v 3			Faculty 2 v 3		
	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level
Intelligence	+1.60	1.15	NS	+4.01	2.69	0.01	+2.41	0.56	NS
Extraversion	-0.92	2.05	0.05	-0.03	0.07	NS	+0.26	0.61	NS
Neuroticism	-0.57	1.14	NS	-0.10	0.22	NS	+0.47	0.93	NS
Locus of C.	-0.51	1.27	NS	-0.07	0.17	NS	+0.44	1.08	NS
A Levels	-0.22	0.90	NS	-0.60	2.27	0.05	-0.38	1.41	NS
Anxiety	+2.32	6.03	0.001	+0.06	0.15	NS	-1.26	3.20	0.01
Motivation	+0.25	0.59	NS	-0.42	1.04	NS	-0.67	1.62	NS
Academic S.C.	-0.08	2.00	0.05	-0.08	2.00	0.05	0.00	0.00	NS
Time	+2.93	3.02	0.01	-1.21	1.20	NS	-4.14	4.82	0.001
Combined S.H.	+9.90	2.33	0.02	-4.32	0.99	NS	-14.22	3.33	0.001

Table IO. Test Variable Means And Standard Deviations For Females In Faculties I and 2 and 3, Irrespective Of Course Pursued

Test Variable	Faculty 1 (N=21)		Faculty 2 (N=130)		Faculty 3 (N=20)	
	Mean	SD	Mean	SD	Mean	SD
Intelligence	119.00	12.35	114.40	11.71	110.45	13.28
Extraversion	12.90	3.82	13.45	4.49	11.90	4.64
Neuroticism	11.57	4.33	11.65	4.94	9.65	4.64
Locus of C.	12.00	3.02	13.21	3.28	12.55	2.58
A Levels	2.19	2.85	3.35	6.15	3.70	2.23
Anxiety	8.09	7.38	5.86	3.70	7.60	3.80
Motivation	7.00	3.41	7.56	3.73	8.20	3.93
Academic S.C.	1.00	0.00	1.21	0.41	1.15	0.37
Time	20.38	7.96	17.61	7.73	25.30	10.84
Combined S.H.	196.90	40.24	191.90	33.22	193.55	46.50

Table II. Mean Test Differences Between Females In Different Faculties "t" Values And Significance Levels *(data derived from Table IO)*

Test Variable	Faculty 1 v 2			Faculty 1 v 3			Faculty 2 v 3		
	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level
Intelligence	+4.60	1.59	NS	+8.55	2.13	0.05	+3.95	1.26	NS
Extraversion	-0.55	0.60	NS	+1.00	0.75	NS	+1.55	1.40	NS
Neuroticism	-0.08	0.08	NS	+1.92	1.37	NS	+2.00	1.78	NS
Locus of C.	-1.21	1.68	NS	-0.55	0.63	NS	+0.66	1.02	NS
A Levels	+1.16	1.41	NS	+1.51	1.89	NS	-0.35	0.48	NS
Anxiety	+2.23	1.36	NS	+0.49	0.27	NS	-1.74	1.91	NS
Motivation	-0.56	0.69	NS	-1.20	1.04	NS	-0.64	0.68	NS
Academic S.C.	+0.21	5.83	0.001	-0.15	1.82	NS	+0.06	0.34	NS
Time	+2.77	1.48	NS	-4.92	1.65	NS	-7.69	3.06	0.01
Combined S.H.	+5.00	0.54	NS	+3.35	0.25	NS	-1.65	0.15	NS

Table I2. Test Variables' Means And Standard Deviations For Males Pursuing Degree Courses In Faculties I and 2 and 3

Test Variable	Faculty 1 (N=98)		Faculty 2 (N=89)		Faculty 3 (N=105)	
	Mean	SD	Mean	SD	Mean	SD
Intelligence	117.32	12.65	110.00	10.90	111.74	11.29
Extraversion	12.17	3.47	13.25	3.91	12.47	3.10
Neuroticism	9.73	3.92	10.71	4.54	10.22	3.74
Locus of C.	12.10	3.81	12.15	3.54	12.06	3.73
A Levels	2.55	2.34	3.01	2.12	3.46	2.49
Anxiety	7.29	3.38	5.42	3.04	7.01	3.52
Motivation	7.71	3.80	7.18	3.94	7.76	3.04
Academic S.C.	1.12	0.33	1.21	0.41	1.17	0.38
Time	19.86	11.35	16.39	6.59	20.64	6.99
Combined S.H.	186.50	44.51	184.52	36.18	193.40	40.80

Table I3. Test Differences Between Degree Course Males In Different Faculties, "t" Values And Significance Levels *(data derived from Table I2)*

Test Variable	Faculty 1 v 2			Faculty 1 v 3			Faculty 2 v 3		
	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level
Intelligence	+7.32	4.25	0.001	+5.58	3.31	0.01	-1.74	1.09	NS
Extraversion	-1.08	1.99	0.05	-0.30	0.65	NS	+0.78	1.52	NS
Neuroticism	-0.98	1.57	NS	-0.49	0.91	NS	+0.49	0.81	NS
Locus of C.	-0.05	0.09	NS	+0.04	0.76	NS	+0.09	0.17	NS
A Levels	-0.46	1.37	NS	-0.91	2.68	0.01	-0.45	1.33	NS
Anxiety	+1.87	3.98	0.001	+0.28	0.58	NS	-1.59	3.38	0.001
Motivation	+0.53	0.94	NS	-0.05	1.03	NS	-0.58	1.13	NS
Academic S.C.	-0.09	1.64	NS	-0.05	1.12	NS	+0.04	0.89	NS
Time	+3.47	2.59	0.02	-0.78	0.58	NS	+4.25	4.35	0.001
Combined S.H.	+1.98	0.33	NS	-6.90	1.15	NS	-8.88	1.61	NS

Table I4. Test Variables' Means And Standard Deviations For Females Pursuing Degree Courses In Faculties I and 2 and 3

Test Variable	Faculty 1 (N=12)		Faculty 2 (N=96)		Faculty 3 (N=18)	
	Mean	SD	Mean	SD	Mean	SD
Intelligence	123.10	7.57	113.61	10.57	111.67	13.28
Extraversion	12.75	3.56	13.06	4.54	12.11	4.24
Neuroticism	11.50	4.66	11.85	4.98	9.72	4.66
Locus of C.	12.33	3.58	13.09	3.39	12.50	2.71
A Levels	2.58	2.23	4.01	6.90	3.94	2.21
Anxiety	7.66	3.08	6.04	4.05	7.56	3.88
Motivation	7.00	3.79	7.43	3.79	8.11	4.09
Academic S.C.	1.00	0.00	1.20	0.40	1.16	0.38
Time	21.00	9.46	18.13	7.16	24.06	9.51
Combined S.H.	203.80	46.95	197.97	32.48	191.70	48.60

Table I5. Mean Test Differences Between Degree Course Females In Different Faculties, "t" Values And Significance Levels

(data derived from Table I4)

Test Variable	Faculty 1 v 2			Faculty 1 v 3			Faculty 2 v 3		
	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level
Intelligence	+9.49	3.89	0.001	+11.43	3.01	0.01	+1.94	0.59	NS
Extraversion	-0.31	0.27	NS	+0.64	0.45	NS	+0.95	0.86	NS
Neuroticism	-0.35	0.02	NS	+1.78	0.97	NS	+2.13	1.59	NS
Locus of C.	-0.76	0.70	NS	-0.17	1.40	NS	+0.59	0.81	NS
A Levels	-1.43	1.50	NS	-1.36	1.64	NS	+0.07	0.08	NS
Anxiety	+1.62	1.65	NS	+0.10	0.08	NS	-1.52	1.52	NS
Motivation	-0.43	0.37	NS	-1.11	0.76	NS	-0.68	0.65	NS
Academic S.C.	-0.20	4.47	0.001	-0.16	1.79	NS	+0.04	0.40	NS
Time	+2.87	1.03	NS	-3.06	2.77	0.01	-5.93	2.52	0.02
Combined S.H.	+5.83	0.42	NS	+12.10	0.68	NS	+6.27	0.53	NS

Table I6. Test Variables' Means And Standard Deviations For Males Pursuing Non Degree Courses In Faculties I and 2 and 3

Test Variable	Faculty 1 (N=62)		Faculty 2 (N=51)		Faculty 3 (N=44)	
	Mean	SD	Mean	SD	Mean	SD
Intelligence	106.10	12.49	113.53	9.07	102.10	15.06
Extraversion	12.47	4.24	13.14	4.09	14.09	3.19
Neuroticism	10.47	3.99	10.39	4.82	9.89	4.42
Locus of C.	11.79	3.04	13.28	3.14	12.05	2.89
A Levels	1.58	1.22	1.29	1.72	1.14	1.17
Anxiety	6.66	3.94	6.27	3.06	6.93	3.88
Motivation	7.05	3.51	7.27	2.98	8.16	3.37
Academic S.C.	1.06	0.25	1.12	0.33	1.20	0.41
Time	16.97	6.75	14.80	7.10	18.32	9.29
Combined S.H.	193.20	27.85	169.90	29.40	193.50	30.90

Table I7. Mean Test Differences Between Non Degree Course Males In Different Faculties, "t" Values And Significance Levels

(data derived from Table I6)

Test Variable	Faculty 1 v 2			Faculty 1 v 3			Faculty 2 v 3		
	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level
Intelligence	-7.43	3.66	0.001	+4.00	1.44	NS	+11.43	4.40	0.001
Extraversion	-0.67	0.85	NS	-1.62	2.24	0.05	-0.95	1.27	NS
Neuroticism	+0.08	0.09	NS	+0.58	0.69	NS	+0.50	0.53	NS
Locus of C.	-1.49	2.55	0.02	-0.26	0.45	NS	+1.23	1.99	0.05
A Levels	+0.29	1.01	NS	-0.44	1.88	NS	-0.15	0.50	NS
Anxiety	+0.39	0.59	NS	-0.27	0.35	NS	-0.66	0.91	NS
Motivation	+0.22	0.38	NS	-1.11	1.64	NS	-0.89	1.36	NS
Academic S.C.	-0.06	1.09	NS	-0.14	2.02	0.05	-0.08	1.04	NS
Time	+2.17	1.66	NS	-1.35	0.82	NS	-3.52	2.05	0. 0
Combined S.H.	+23.30	4.29	0.001	-0.30	0.05	NS	-23.60	3.80	0.00

Table I8. Test Variables' Means And Standard Deviations For Females Pursuing Non Degree Courses In Faculties I and 2 and 3

Test Variable	Faculty 1 (N=9)		Faculty 2 (N=34)		Faculty 3 (N=2)	
	Mean	SD	Mean	SD	Mean	SD
Intelligence	113.67	15.67	116.70	14.42	99.50	9.19
Extraversion	13.11	4.37	14.56	4.23	10.00	0.00
Neuroticism	11.66	4.12	11.06	4.84	9.00	2.80
Locus of C.	11.55	2.19	13.53	2.96	13.00	1.41
A Levels	1.68	1.26	1.50	2.39	1.50	0.70
Anxiety	8.67	11.06	5.38	2.41	8.00	4.25
Motivation	7.00	3.04	7.94	3.58	9.00	2.83
Academic S.C.	1.00	0.00	1.26	0.45	1.00	0.00
Time	19.56	5.85	16.18	9.09	36.50	20.51
Combined S.H.	187.80	29.20	175.03	29.60	210.50	19.09

Table 19. Mean Test Differences Between Non Degree Course Females In Different Faculties, "t" Values And Significance Levels

(data derived from Table 18)

Test Variable	Faculty 1 v 2 Diff.	't'	Sig. Level	Faculty 1 v 3 Diff.	't'	Sig. Level	Faculty 2 v 3 Diff.	't'	Sig. Level
Intelligence	-3.03	0.52	NS	+14.17	1.70	NS	+17.20	2.47	0.02
Extraversion	-1.45	0.89	NS	+3.11	2.14	NS	+4.56	6.08	0.001
Neuroticism	+0.60	0.37	NS	+2.66	1.76	NS	+2.06	1.98	NS
Locus of C.	-1.98	2.23	0.05	-1.45	1.17	NS	+0.53	0.47	NS
A Levels	+0.18	0.31	NS	+0.18	0.28	NS	0.00	0.00	NS
Anxiety	+3.29	0.88	NS	+0.67	0.14	NS	-2.62	0.87	NS
Motivation	-0.94	0.80	NS	-2.00	0.68	NS	-1.06	0.51	NS
Academic S.C.	-0.26	3.36	0.01	0.00	0.00	NS	+0.26	3.36	0.01
Time	+3.38	1.34	NS	-16.94	1.12	NS	-20.32	1.34	NS
Combined S.H.	+12.77	1.16	NS	-22.70	1.36	NS	-35.47	2.46	0.02

Table 20. Test Variables' Means And Standard Deviations For Degree And Non Degree Course Students In Faculties I and 2 and 3

Course	Test Variable	Faculty 1 (N=110) Mean	SD	Faculty 2 (N=185) Mean	SD	Faculty 3 (N=123) Mean	SD
Degree	Intelligence	118.00	12.31	111.88	10.86	111.73	11.54
	Extraversion	12.24	3.47	13.15	4.24	12.41	3.28
	Neuroticism	9.93	4.02	11.30	4.79	10.15	3.87
	Locus of C.	12.13	3.77	12.64	3.49	12.12	3.59
	A Levels	2.55	2.32	3.53	2.45	3.53	2.45
	Anxiety	7.34	3.34	5.74	3.60	7.09	3.56
	Motivation	7.64	3.79	7.31	3.86	7.81	3.19
	Academic S.C.	1.11	0.31	1.21	0.41	1.17	0.38
	Time	19.91	11.13	17.29	6.93	21.13	7.47
	Combined S.H.	188.39	44.89	191.49	34.87	193.11	41.80
Course	Test Variable	Faculty 1 (N=71)		Faculty 2 (N=85)		Faculty 3 (N=46)	
Non-Degree	Intelligence	107.06	13.06	114.78	11.54	102.00	14.96
	Extraversion	12.55	4.23	13.71	4.18	13.91	3.24
	Neuroticism	10.62	4.00	10.66	4.81	9.85	4.34
	Locus of C.	11.76	2.93	13.26	3.06	12.09	2.83
	A Levels	1.59	1.47	1.38	2.01	1.15	1.15
	Anxiety	6.92	5.29	5.92	2.84	6.98	3.85
	Motivation	7.04	3.43	7.54	3.23	8.19	3.32
	Academic S.C.	1.06	0.23	1.18	0.40	1.19	0.40
	Time	17.29	6.66	15.35	7.94	19.11	10.28
	Combined S.H.	192.50	27.86	171.96	29.38	194.30	1.80

Table 2I. Mean Test Differences Between Degree Course Students Of Different faculties, "t" Values And Significance Levels

(data derived from Table 20)

Test Variable	Faculty 1 v 2			Faculty 1 v 3			Faculty 2 v 3		
	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level
Intelligence	+6.12	4.31	0.001	+6.27	4.00	0.001	+0.15	0.11	NS
Extraversion	-0.91	2.00	0.05	-0.17	0.38	NS	+0.74	1.72	NS
Neuroticism	-1.37	2.60	0.01	-0.22	0.42	NS	+1.15	2.32	0.05
Locus of C.	-0.51	1.16	NS	+0.01	0.02	NS	+0.52	1.26	NS
A Levels	-0.98	1.81	NS	-0.98	3.13	0.01	0.00	0.00	NS
Anxiety	+1.60	3.87	0.001	+0.25	0.55	NS	-1.35	3.25	0.01
Motivation	+0.31	0.71	NS	-0.17	0.37	NS	-0.50	1.32	NS
Academic S.C.	-0.10	1.87	NS	-0.06	1.33	NS	+0.04	0.71	NS
Time	+2.62	2.22	0.05	-1.20	0.95	NS	-3.84	4.54	NS
Combined S.H.	-3.10	0.62	NS	-4.72	0.83	NS	-1.62	0.35	NS

Table 22. Mean Test Differences Between Non Degree Course Students Of Different Faculties, "t" Values And Significance Levels

(data derived from Table 20)

Test Variable	Faculty 1 v 2			Faculty 1 v 3			Faculty 2 v 3		
	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level	Diff.	't'	Sig. Level
Intelligence	-7.72	3.88	0.001	+5.06	2.08	0.05	+12.78	5.04	0.00
Extraversion	-1.16	1.71	NS	-1.36	1.96	0.05	-0.20	0.30	NS
Neuroticism	-0.04	0.06	NS	+0.77	0.97	NS	+0.81	0.98	NS
Locus of C.	-1.50	2.76	0.01	-0.33	0.61	NS	+1.17	2.19	0.05
A Levels	+0.21	0.75	NS	+0.44	1.81	NS	+0.23	0.85	NS
Anxiety	+1.00	1.43	NS	-0.06	0.07	NS	-1.06	0.09	NS
Motivation	-0.50	0.93	NS	-1.15	1.80	NS	-0.65	1.08	NS
Academic S.C.	-0.12	2.43	0.02	-0.13	2.00	0.05	-0.01	0.14	NS
Time	+1.94	1.66	NS	-1.82	1.06	NS	3.76	2.16	0.05
Combined S.H.	+20.54	4.47	0.001	-1.80	0.32	NS	-22.34	4.05	0.001

RESULTS RELATING TO DIFFERENCES AND RELATIONSHIPS BETWEEN GROUPS OF STUDENTS, CLASSIFIED ACCORDING TO TYPE OF COURSE PURSUED

NULL HYPOTHESIS THREE, stated that :

No significant differences in intelligence, extraversion, neuroticism, locus of control, A levels, anxiety, motivation, academic self concept, time spent studying and combined study habits, exist between degree course and non degree course students for (a) the total sample, (b) within faculties, and, (c) sub groups in each faculty with sex held constant

Table 23. Test Variables' Means, Standard Deviations, Mean Differences And "t" Values For Degree Course And Non Degree Courses, Irrespective Of Faculty Membership

Test Variable	Degree (N=418)		Non-Degree (N=202)		Mean Diff.	't'	Sig. Level
	Mean	SD	Mean	SD			
Intelligence	113.40	11.74	109.16	4.24	4.24	3.75	0.001
Extraversion	12.69	3.79	13.35	4.02	0.66	1.96	0.05
Neuroticism	10.60	4.38	10.46	4.42	0.14	0.37	NS
Locus of C.	12.35	3.60	12.46	3.03	0.11	0.40	NS
A Levels	3.27	3.91	1.40	3.04	1.87	6.61	0.001
Anxiety	6.56	3.59	6.51	4.08	0.05	0.15	NS
Motivation	7.54	3.66	7.51	3.33	0.03	0.10	NS
Academic S.C.	1.17	0.37	1.13	0.35	0.04	1.33	NS
Time	19.13	8.53	16.89	8.22	2.24	3.14	0.01
Combined S.H.	191.15	39.72	184.30	30.83	6.85	2.91	0.02

Table 24. Test Variables' Means, Standard Deviations, Mean Differences, "t" Values For Degree Course And Non Degree Course Students In Faculties I and 2 and 3

Faculty	Test Variable	Degree Mean	Degree SD	Non-Degree Mean	Non-Degree SD	Mean Diff.	't'	Sig. Level
1	Intelligence	118.00	12.31	107.06	13.06	10.94	5.64	0.00
	Extraversion	12.24	3.47	12.55	4.23	0.31	0.52	NS
Degree	Neuroticism	9.93	4.02	10.62	4.00	0.69	1.13	NS
N=110	Locus of C.	12.13	3.77	11.76	2.93	0.37	0.74	NS
	A Levels	2.55	2.32	1.59	1.47	0.96	3.42	0.001
Non-	Anxiety	7.34	3.34	6.92	5.29	0.42	0.60	NS
Degree	Motivation	7.64	3.79	7.04	3.43	0.60	1.10	NS
N=71	Academic S.C.	1.11	0.31	1.06	0.23	0.05	1.25	NS
	Time	19.91	11.13	17.29	6.66	2.62	1.98	0.05
	Combined S.H.	188.39	44.89	192.50	27.86	4.11	0.76	NS
2	Intelligence	111.88	10.86	114.78	11.54	2.90	2.64	0.01
	Extraversion	13.15	4.24	13.71	4.18	0.56	1.02	NS
	Neuroticism	11.30	4.79	10.66	4.81	0.64	1.05	NS
Degree N=185	Locus of C.	12.64	3.49	13.26	3.06	0.62	1.48	NS
	A Levels	3.53	5.19	1.38	2.01	2.15	4.92	0.001
	Anxiety	5.74	3.60	5.92	2.84	0.18	0.44	NS
Non-	Motivation	7.31	3.36	7.54	3.23	0.23	0.54	NS
Degree N=85	Academic S.C.	1.21	0.41	1.18	0.38	0.03	0.49	NS
	Time	17.29	6.93	15.35	7.94	1.94	1.94	NS
	Combined S.H.	191.49	34.87	171.96	29.38	19.53	4.74	0.001
3	Intelligence	111.73	11.54	102.00	14.96	9.73	3.99	0.001
	Extraversion	12.41	3.28	13.91	3.24	1.50	2.67	0.01
	Neuroticism	10.15	3.87	9.85	4.34	0.30	0.41	NS
Degree N=123	Locus of C.	12.12	3.59	12.09	2.83	0.03	0.06	NS
	A Levels	3.53	2.45	1.15	1.15	2.38	8.75	0.001
	Anxiety	7.09	3.56	6.98	3.85	0.11	0.17	NS
Non-	Motivation	7.81	3.19	8.19	3.32	0.38	0.67	NS
Degree N=46	Academic S.C.	1.17	0.38	1.19	0.40	0.02	0.29	NS
	Time	21.13	7.47	19.11	10.28	2.02	1.22	NS
	Combined S.H.	193.11	41.80	194.30	30.50	1.19	0.20	NS

Table 25. Test Variables' Means, Standard Deviations, Mean Differences And "t" Values For Degree Course And Non Degree Course Students In Faculties I and 2 and 3

Faculty	Test Variable	Degree		Non-Degree		Mean Diff.	't'	Sig. Level
		Mean	SD	Mean	SD			
1	Intelligence	117.32	12.65	106.10	12.49	11.22	5.51	0.001
	Extraversion	12.17	3.47	12.47	4.24	0.30	0.15	NS
	Neuroticism	9.73	3.92	10.47	3.94	0.74	1.16	NS
Degree N=98	Locus of C.	12.10	3.81	11.79	3.04	0.31	0.57	NS
	A Levels	2.55	2.34	1.58	1.22	0.97	3.43	0.001
	Anxiety	7.29	3.38	6.66	3.94	0.63	1.04	NS
Non-Degree N=62	Motivation	7.71	3.80	7.05	3.51	0.66	1.12	NS
	Academic S.C.	1.12	0.33	1.06	0.25	0.06	1.34	NS
	Time	19.86	11.35	16.97	6.75	2.89	2.02	0.05
	Combined S.H.	186.50	44.51	193.20	27.85	6.70	1.17	NS
2	Intelligence	110.00	10.90	113.53	9.07	3.53	2.06	0.05
	Extraversion	13.25	3.91	13.14	4.09	0.11	0.16	NS
	Neuroticism	10.71	4.54	10.39	4.82	0.32	0.38	NS
Degree N=89	Locus of C.	12.15	3.54	13.28	3.14	1.13	1.96	0.05
	A Levels	3.01	2.12	1.29	1.72	1.72	5.23	0.001
	Anxiety	5.42	3.04	6.27	3.06	0.85	1.58	NS
Non-Degree N=51	Motivation	7.18	3.94	7.27	2.98	0.09	0.15	NS
	Academic S.C.	1.21	0.41	1.12	0.33	0.09	0.14	NS
	Time	16.39	6.59	14.80	7.10	1.59	1.31	NS
	Combined S.H.	184.52	36.18	169.90	29.40	14.62	2.61	0.02
3	Intelligence	111.74	11.29	102.10	15.06	9.64	3.82	0.001
	Extraversion	12.47	3.10	14.09	3.19	1.62	2.85	0.01
Degree N=105	Neuroticism	10.22	3.74	9.89	4.42	0.33	0.43	NS
	Locus of C.	12.06	3.73	12.95	2.89	0.89	1.57	NS
	A Levels	3.46	2.49	1.14	1.17	2.32	7.73	0.001
	Anxiety	7.01	3.52	6.93	3.88	0.08	0.01	NS
Non-Degree N=44	Motivation	7.76	3.04	8.16	3.37	0.40	0.68	NS
	Academic S.C.	1.17	0.38	1.20	0.41	0.03	0.43	NS
	Time	20.64	6.99	18.32	9.29	2.32	1.49	NS
	Combined S.H.	193.40	40.80	193.50	30.90	0.10	0.02	NS

Table 26. Test Variables' Means, Standard Deviations, Mean Differences And "t" Values For Degree Course And Non Degree Course Females In Faculties I and 2 and 3

Faculty	Test Variable	Degree Mean	Degree SD	Non-Degree Mean	Non-Degree SD	Mean Diff.	't'	Sig. Level
1	Intelligence	123.10	7.57	113.67	15.67	9.43	5.43	0.001
	Extraversion	12.75	3.56	13.11	4.37	0.36	0.64	NS
Degree N=12	Neuroticism	11.50	4.66	11.66	4.12	0.16	0.03	NS
	Locus of C.	12.33	3.58	11.55	2.19	0.78	0.19	NS
	A Levels	2.58	2.23	1.68	1.26	0.90	1.17	NS
	Anxiety	7.66	3.08	8.67	11.06	1.01	0.09	NS
Non-Degree N=9	Motivation	7.00	3.79	7.00	3.04	0.00	0.00	NS
	Academic S.C.	1.00	0.00	1.00	0.00	0.00	0.00	NS
	Time	21.00	9.46	19.56	5.85	1.44	0.13	NS
	Combined S.H.	203.80	46.95	187.80	29.20	16.00	2.90	0.01
2	Intelligence	113.61	10.57	116.70	14.42	3.09	1.14	NS
	Extraversion	13.06	4.54	14.56	4.23	1.50	1.74	NS
Degree N=96	Neuroticism	11.85	4.98	11.06	4.84	0.79	0.81	NS
	Locus of C.	13.09	3.39	13.53	2.96	0.44	0.71	NS
	A Levels	4.01	6.90	1.50	2.39	2.51	3.08	0.01
	Anxiety	6.04	4.05	5.38	2.41	0.66	1.13	NS
Non-Degree N=34	Motivation	7.43	3.79	7.94	3.58	0.51	0.62	NS
	Academic S.C.	1.20	0.40	1.26	0.45	0.06	0.69	NS
	Time	18.13	7.16	16.18	9.09	1.95	1.13	NS
	Combined S.H.	197.97	32.48	175.03	29.60	22.94	3.78	0.001
3	Intelligence	111.73	11.54	102.00	14.96	9.73	0.89	NS
	Extraversion	12.11	4.24	10.00	0.00	2.11	2.11	0.05
Degree N=18	Neuroticism	9.72	4.66	9.00	2.80	0.72	0.32	NS
	Locus of C.	12.50	2.71	13.00	1.41	0.50	0.42	NS
	A Levels	3.94	2.21	1.50	0.70	2.44	3.40	0.01
	Anxiety	7.56	3.88	8.00	4.25	0.44	0.14	NS
Non-Degree N=2	Motivation	8.11	4.09	9.00	2.83	0.89	0.40	NS
	Academic S.C.	1.16	0.38	1.00	0.00	0.16	1.80	NS
	Time	24.06	9.51	36.50	20.51	12.44	0.85	NS
	Combined S.H.	191.70	48.60	210.50	19.09	18.80	1.06	NS

RESULTS RELATING TO DIFFERENCES AND RELATIONSHIPS BETWEEN FEMALES AND MALES ON THE SUB TESTS OF STUDY HABITS

NULL HYPOTHESIS FOUR, stated that :

No significant differences exist between Females and Males in each faculty for performance on the various sub tests of study habits.

Table 27. Means, Standard Dev'ations, Mean Differ. For Females & Males

Sub-test	Sex	Faculty 1		Faculty 2		Faculty 3	
		Mean	SD	Mean	SD	Mean	SD
1	Females	33.81	9.94	34.75	6.38	35.20	7.53
	Males	33.24	7.48	32.71	7.07	33.91	6.61
	Mean Diff.	0.57		2.04**		1.29	
2	Females	32.24	5.96	31.38	7.17	30.30	8.40
	Males	31.06	8.12	30.03	6.19	31.23	6.97
	Mean Diff.	1.18		1.35		0.93	
3	Females	25.95	6.61	24.64	6.02	26.80	7.85
	Males	22.89	5.88	22.29	6.21	25.51	5.23
	Mean Diff.	3.06*		2.35**		1.29	
4	Females	23.57	6.21	25.81	7.02	26.70	8.08
	Males	25.06	7.88	23.64	8.45	24.47	8.00
	Mean Diff.	1.49		2.17*		2.23	
5	Females	25.19	7.70	24.53	6.38	24.75	9.49
	Males	22.96	6.93	22.73	8.12	24.37	7.86
	Mean Diff.	2.23		1.80*		0.38	
6	Females	23.67	8.39	20.28	8.18	21.20	10.53
	Males	20.99	8.15	18.61	7.53	22.09	9.04
	Mean Diff.	2.68		1.67		0.89	
7	Females	32.52	9.00	30.58	6.68	28.60	9.45
	Males	32.89	7.94	29.18	7.45	31.83	8.10
	Mean Diff.	0.37		1.40		3.23	

* Significant at 0.05 level; ** Significant at 0.01 level
Faculty 1 : Females N=21; Males N=160; Faculty 2 : Females N=130; Males N=140; Faculty 3 : Females N=20; Males N=149

RESULTS RELATING TO DIFFERENCES AND RELATIONSHIPS BETWEEN STUDENTS OF DIFFERENT FACULTIES ON THE SUB TESTS OF STUDY HABITS

NULL HYPOTHESIS FIVE, stated that :

No significant differences exist between (a) students of different faculties on the sub tests, and, (b) students of different faculties classified according to type of course pursued

Table 28. Means, Standard Deviations For Students In Faculties I, 2, 3 (Sub tests I-7)

Sub-test	Faculty 1 (N=181)		Faculty 2 (N=270)		Faculty 3 (N=169)	
	Mean	SD	Mean	SD	Mean	SD
1	33.31	7.77	33.69	6.81	34.06	6.72
2	31.19	7.90	30.68	6.70	31.12	7.13
3	23.25	6.03	23.42	6.22	25.66	6.00
4	24.89	7.70	24.68	6.81	24.73	8.03
5	23.22	7.04	23.60	7.38	24.41	8.03
6	21.30	8.20	19.42	7.88	21.99	9.20
7	32.85	8.05	29.86	7.11	31.45	8.31

Table 29. Mean Faculty Differences On Various Sub Tests, "t" Values And Significance Levels *(data derived from Table 28)*

Sub-test	Faculty 1 v 2			Faculty 1 v 3			Faculty 2 v 3		
	Mean Diff.	't'	Sig. Level	Mean Diff.	't'	Sig. Level	Mean Diff.	't'	Sig. Level
1	-0.38	0.53	NS	-0.75	0.97	NS	-0.37	0.56	NS
2	+0.51	0.71	NS	+0.07	0.09	NS	-0.44	0.64	NS
3	-0.17	0.29	NS	-2.41	3.75	0.001	-2.24	3.75	0.001
4	+0.21	0.30	NS	+0.16	0.19	NS	-0.05	0.07	NS
5	-0.38	0.55	NS	-1.19	1.47	NS	-0.81	1.06	NS
6	+1.88	2.43	0.02	-0.69	0.74	NS	-2.57	3.01	0.01
7	+2.99	4.05	0.001	+1.40	1.60	NS	-1.59	2.06	0.05

Table 30. Means, Standard Deviations For Degree Course And Non Degree Course Students In Different Faculties (Sub tests I-7)

Course Level	Sub-test	Faculty 1 (N=110)		Faculty 2 (N=185)		Faculty 3 (N=123)	
		Mean	SD	Mean	SD	Mean	SD
Degree	1	32.84	8.83	35.01	6.46	33.87	6.92
	2	30.74	7.70	31.43	6.99	30.78	7.41
	3	22.70	6.89	23.66	6.45	25.57	6.33
	4	24.06	8.69	26.02	6.47	25.05	8.30
	5	23.17	8.23	24.53	7.14	24.32	8.30
	6	21.72	9.45	20.23	8.15	21.90	9.47
	7	33.15	8.14	30.62	6.79	31.63	8.43
Course Level	Sub-test	Faculty 1 (N=71)		Faculty 2 (N=85)		Faculty 3 (N=46)	
		Mean	SD	Mean	SD	Mean	SD
Non-Degree	1	34.04	5.76	30.81	6.72	34.59	6.18
	2	31.89	8.21	29.04	5.94	32.02	6.29
	3	24.10	4.28	22.91	5.71	25.91	5.07
	4	26.17	5.67	21.79	6.65	23.89	7.24
	5	23.29	4.69	21.58	7.52	24.67	1.38
	6	20.65	5.76	17.66	6.98	22.22	8.53
	7	32.28	7.94	28.19	7.53	30.97	8.04

Table 3I. Mean Faculty Differences On Various Sub Tests, "t" Values And Significance Levels For Degree Course Students

(data derived from Table 30)

Sub-test	Faculty 1 v 2			Faculty 1 v 3			Faculty 2 v 3		
	Mean Diff.	't'	Sig. Level	Mean Diff.	't'	Sig. Level	Mean Diff.	't'	Sig. Level
1	-2.27	2.35	0.02	-1.03	0.98	NS	+1.14	1.45	NS
2	-0.69	0.77	NS	-0.04	0.04	NS	+0.65	0.77	NS
3	-0.96	1.18	NS	-2.87	3.29	0.001	-2.91	3.92	0.001
4	-1.96	2.05	0.05	-0.99	0.88	NS	+0.97	1.09	NS
5	-1.36	1.44	NS	-1.15	1.06	NS	+0.21	0.23	NS
6	+1.49	1.37	NS	-0.18	0.14	NS	-1.67	1.61	NS
7	+2.53	2.74	0.01	+1.52	1.39	NS	-1.01	1.11	NS

Table 32. Mean Faculty Differences On Various Sub Tests, "t" Values And Significance Levels For Non Degree Course Students

(data derived from Table 30)

Sub-test	Faculty 1 v 2			Faculty 1 v 3			Faculty 2 v 3		
	Mean Diff.	't'	Sig. Level	Mean Diff.	't'	Sig. Level	Mean Diff.	't'	Sig. Level
1	+3.17	3.17	0.01	-0.49	0.43	NS	-3.78	3.24	0.01
2	+2.85	2.44	0.02	-0.13	0.10	NS	-2.98	2.68	0.01
3	+1.19	1.49	NS	-1.81	2.00	0.05	-3.00	3.09	0.01
4	+4.38	4.44	0.001	-2.28	1.81	NS	-2.10	1.64	NS
5	+1.71	1.73	NS	-1.38	1.13	NS	-3.09	2.27	0.05
6	+2.99	2.93	0.001	-1.57	1.10	NS	-4.56	3.10	0.01
7	+4.19	3.43	0.001	+1.41	0.93	NS	-2.78	1.97	0.05

RESULTS RELATING TO DIFFERENCES AND RELATIONSHIPS BETWEEN STUDENTS IN EACH FACULTY PURSUING DEGREE COURSES AND NON DEGREE COURSES, ON THE SUB TESTS OF STUDY HABITS

NULL HYPOTHESIS SIX, stated that :

Within each faculty, there are no significant mean differences between degree course and non degree course students on the sub tests of study habits.

Table 33. Means, Standard Deviations And Mean Differences For Degree Course And Non Degree Course Students In Faculties I, 2, 3 (Sub tests I-7)

Sub-test	Faculty 1					Faculty 2					Faculty 3				
	Degree N=110		Non-Deg N=71			Degree N=185		Non-Deg N=85			Degree N=123		Non-Deg N=46		
	Mean	SD	Mean	SD	Mean Diff	Mean	SD	Mean	SD	Mean Diff	Mean	SD	Mean	SD	Mean Diff
1	32.84	8.83	34.04	5.76	1.21	35.01	6.46	30.81	6.72	4.20**	33.87	6.92	34.59	6.18	0.72
2	30.74	7.70	31.89	8.21	1.15	31.43	6.99	29.04	5.74	2.39**	30.78	7.41	32.02	6.29	1.24
3	22.70	6.89	24.10	4.28	1.40	23.66	6.45	22.91	5.71	0.75	25.57	6.33	25.91	5.07	0.34
4	24.06	8.69	26.17	5.67	2.11*	26.02	6.47	21.79	6.65	4.23***	25.05	8.30	23.89	7.24	1.16
5	23.17	8.23	23.29	4.69	0.08	24.53	7.14	21.58	7.52	2.95**	24.32	8.30	24.67	7.37	0.35
6	21.72	9.45	20.65	5.76	1.07	20.23	8.15	17.66	2.57	2.66**	21.90	9.47	22.22	8.53	0.32
7	33.15	8.14	32.38	7.94	0.77	30.62	6.79	28.19	7.53	2.43**	31.63	8.43	30.97	8.04	0.66

* Significant at the 0.05 level

** Significant at the 0.01 level

*** Significant at the 0.001 level

RESULTS RELATING TO DIFFERENCES AND RELATIONSHIPS BETWEEN STUDENTS TESTED ON THE SUB TESTS OF STUDY HABITS ON TWO SEPARATE OCCASIONS

NULL HYPOTHESIS SEVEN, stated that :

No significant differences exist between students tested initially and after a period of one year on the various sub tests of study habits.

Table 34. Means, Standard Deviations And Medians For A Cross Faculty Sample Of Students Tested Initially And After A Period Of One Year For The Sub Tests Of Study Habits

Study Skill	Initial Testing			Second Testing			Mean Diff.
	Mean	SD	Med	Mean	SD	Med	
Exam Technique (1)	33.23	7.79	34	33.22	8.38	34	0.01
Swotting (2)	31.37	7.16	32	31.67	7.63	35	0.30
Note Taking (3)	24.27	6.33	23	24.42	7.04	24	0.15
Reading (4)	24.85	8.12	25	25.16	8.72	25	0.31
Organisation (5)	25.07	7.13	25	25.30	8.30	25	0.23
Time of Study (6)	22.10	7.80	22	20.50	9.07	20	1.60
Place (7)	30.92	8.30	31	30.72	9.26	30	0.20
Combined Studies	191.82	39.59	193	191.99	44.48	188	0.17

No mean difference is statistically significant

NULL HYPOTHESIS EIGHT, stated that :

No significant relationships exist between students' initial scores on the sub tests of study habits and their later scores on the same tests.

Table 35. Correlation Coefficients Between Initial And Later Test Scores On The Sub Tests Of Study Habits For A Cross Faculty Sample Of Students

Study Skill Variable	'r'	Sig. Level
1	0.73	0.01
2	0.67	0.01
3	0.58	0.01
4	0.71	0.01
5	0.69	0.01
6	0.67	0.01
7	0.58	0.01
Combined	0.75	0.01

RESULTS RELATING TO RELATIONSHIPS BETWEEN COMBINED STUDY HABITS AND THE DIFFERENT VARIABLES TESTED

NULL HYPOTHESIS NINE, stated that :

No significant relationship exists between combined study habits and intelligence, extraversion, neuroticism, locus of control, A levels, anxiety, motivation, time spent studying and academic self concept and examination performance for (a) the total sample, and (b) each faculty, and (c) the sexes within each faculty.

Table 36. Correlation Coefficients Between Combined Study Habits And Other Test Variables For Degree Course And Non Degree Course Students

Test Variable	Degree Course (N=418) r	Non-Degree Course (N=202) r
Intelligence	0.074	- 0.012
Extraversion	- 0.111 *	0.004
Neuroticism	- 0.155 **	- 0.133
Locus of C.	- 0.100 *	- 0.200 **
A Levels	0.010	- 0.039
Anxiety	- 0.170 **	0.063
Motivation	- 0.375 **	- 0.165 *
Academic S.C.	0.236 **	0.147 *
Time	0.175 **	0.213 **
Examinations	0.223 **	0.088

* Significant at the 0.05 level

** Significant at the 0.01 level

Table 37. Correlation Coefficients Between Combined Study Habits And Other Test Variables For Students Classified According To Sex And Type Of Course Pursued

Test Variable	Degree Course		Non-Degree Course	
	Males(N=292) 'r'	Females(N=126) 'r'	Males(N=157) 'r'	Females(N=45) 'r'
Intelligence	0.041	0.149	- 0.047	0.192
Extraversion	- 0.111	- 0.128	0.051	- 0.119
Neuroticism	- 0.164 **	- 0.200 *	- 0.086	- 0.271
Locus of C.	- 0.126 *	- 0.074	- 0.207 **	- 0.128
A Levels	0.048	- 0.049	0.027	- 0.077
Anxiety	- 0.165 **	- 0.778 **	- 0.078	0.280
Motivation	- 0.406 **	- 0.309 **	- 0.109	- 0.349 *
Academic S.C.	0.245 **	0.199	0.125	0.324 *
Time	0.204 **	0.092	0.190	0.310 *
Examinations	0.191 **	0.312 **	0.052	0.250

* Significant at the 0.05 level

** Significant at the 0.01 level

Table 38. Correlation Coefficients Between Combined Study Habits And Other Test Variables For (a) The Sexes In Each Faculty, and, (b) Each Faculty Group Of Students

Test Variable	Faculty 1			Faculty 2			Faculty 3		
	Males N=160 'r'	Females N=21 'r'	All N=181 'r'	Males N=140 'r'	Females N=130 'r'	All N=240 'r'	Males N=149 'r'	Females N=20 'r'	All N=169 'r'
Intelligence	-0.063	0.289	-0.016	-0.053	0.144	0.056	0.179*	0.393	0.192*
Extraversion	-0.075	-0.115	-0.076	-0.076	-0.134	-0.098	0.024	0.179	0.042
Neuroticism	-0.204**	-0.316	-0.208**	-0.140	-0.139	-0.116	-0.029	-0.413	-0.078
Locus of C.	-0.178*	0.006	-0.159*	-0.112	-0.119	-0.092	-0.149	0.029	-0.136
A Levels	-0.071	-0.272	-0.097	0.100	0.064	0.084	0.095	-0.233	0.053
Anxiety	-0.158*	0.341	-0.045	-0.197*	-0.128	-0.153*	-0.105	-0.472	-0.151
Motivation	-0.363**	-0.307	-0.358**	-0.319**	-0.238**	-0.266**	-0.293**	-0.677**	-0.340**
Academic S.C.	0.078	-0.010	0.069	0.194*	0.277**	0.242**	0.368**	0.606*	0.394**
Time	0.207**	0.330	0.221**	0.220**	0.175*	0.215**	0.133	0.141	0.114
Examinations	0.063	0.261	0.085	0.044	0.212*	0.147*	0.244**	0.702**	0.298**

* Significant at the 0.05 level

** Significant at the 0.01 level

RELATIONSHIPS BETWEEN SEPARATE STUDY HABITS AND OTHER TEST VARIABLES

NULL HYPOTHESIS TEN, stated that :

No significant relationships exist between separate study habits and the variables of intelligence, extraversion, neuroticism, locus of control, A levels, anxiety, motivation, academic self concept and time spent studying, for, (a) students pursuing different types of courses, and, (b) male and female students pursuing different types of courses, irrespective of faculty membership.

Table 39. Correlation Coefficients Between Separate Study Habits And Other Test Variables For Degree Course Students (n = 4I8)

Study Skill	Test Variable: Intell	Extra	Neur	Locus	A's	Anx	Motiv	Time	Concept
1	0.0727	-0.0457	-0.0876	0.0317	0.0740	-0.1679**	-0.1776**	0.0697	0.1785**
2	0.0855	-0.0117	-0.0879*	-0.0588	0.0215	-0.0888	-0.1929**	0.0463	0.1402**
3	0.0967*	-0.1281**	-0.1360**	-0.0727	0.0246	-0.1442**	-0.2256**	0.1251	0.2303**
4	0.0356	-0.1053	-0.1189*	-0.0836	-0.0229	-0.2047**	-0.3117**	0.1417**	0.1444**
5	0.0131	-0.0854	-0.1510**	-0.0735	-0.0034	-0.2053**	-0.3256**	0.1278**	0.2322**
6	0.0231**	-0.1329**	-0.1390**	-0.1232*	-0.0153	-0.0311	-0.4160**	0.2402**	0.1820**
7	0.0971*	-0.0597	-0.0856	-0.1282**	-0.0144	-0.0594	-0.2683**	0.1368**	0.1278**

* Significant at the 0.05 level

** Significant at the 0.0I level

*** Significant at the 0.00I level

Table 40. Correlation Coefficients Between Separate Study Habits And Other Test Variables, Other Than Examinations, For Degree Course Males (n = 292) And Degree Course Females (n = I26)

Study Skill	Sex	Intell	Extra	Neur	Locus	A's	Anx	Motiv	Time	Concept
1	Male	0.0486	-0.0975	-0.0887	-0.0107	0.1024	-0.1923*	-0.1923*	0.1092	0.1897*
	Female	0.1189	0.0431	-0.1658	0.0925	0.0336	-0.1102	-0.1452	-0.0481	0.1288
2	Male	0.0441	-0.0300	-0.1170	-0.1010	0.0164	-0.1189	-0.1880*	0.0819	0.1630
	Female	-0.1772*	0.0122	-0.0761	0.0114	0.0107	-0.0224	-0.2038*	-0.0474	0.0700
3	Male	0.0498	-0.1225	-0.1226	-0.0731	0.1208	-0.1267	-0.3023**	0.1248	0.2044*
	Female	-0.1977*	-0.1558	-0.2194*	-0.1231	-0.0806	-0.1735	-0.0609	0.1259	0.2854**
4	Male	0.0414	-0.0692	-0.1333	-0.1239	-0.0041	-0.1937*	-0.3513**	0.1676	0.1430
	Female	-0.0011	-0.1985*	-0.1467	-0.0174	-0.0745	-0.2288**	-0.2205*	0.0672	0.1342
5	Male	-0.0357	-0.0432	-0.1945*	-0.0951	-0.0030	-0.1824*	-0.3466**	0.1618	0.2376**
	Female	-0.0343	-0.1958*	-0.1166	-0.0584	-0.0306	-0.2606**	-0.2803**	0.0254	0.2043*
6	Male	0.0111	-0.1067	-0.1561	-0.1148	0.0107	-0.0063	-0.4489	0.2493**	0.2262*
	Female	-0.0525	0.1846*	-0.1145	-0.1507	-0.0434	-0.0804	-0.3444**	0.2175*	0.0691
7	Male	0.0658	-0.1169	-0.0428	-0.1380	0.0306	-0.0683	-0.2759**	0.1568	0.1246
	Female	-0.1862*	0.0551	-0.1716	-0.0962	-0.0581	-0.0428	-0.2529**	0.0821	0.1401

* Significant at the 0.05 level

** Significant at the 0.0I level

Table 4I. Correlation Coefficients Between Separate Study Habits And Other Test Variables, Other Than Examinations, For Non Degree Course Students (n = 202)

Study Skill	Intell	Extra	Neur	Locus	A's	Anx	Motiv	Time	Concept
1	0.0783	0.0512	-0.0802	-0.0844	-0.0925	0.0474	0.0311	0.1375*	0.0833
2	0.0040	0.0605	-0.0612	-0.0678	-0.0624	0.1081	0.0276	0.0531	0.0718
3	0.0654	-0.0301	-0.0322	-0.1339*	-0.1401*	0.0318	-0.1766*	0.2241**	0.1777*
4	0.1176	-0.0553	-0.0822	-0.0770	0.0524	-0.0854	-0.0906	0.0345	0.1457*
5	-0.1519*	-0.0214	-0.0831	-0.1764*	0.0330	0.0750	-0.1849**	0.1654*	0.0505
6	-0.1142	0.0022	-0.0193	-0.1046	-0.0357	0.0378	-0.2381**	0.3267**	0.1480*
7	0.0359	0.0050	-0.1531*	-0.2457**	-0.0577	0.0639	-0.1248	0.6563	0.0241

* Significant at the 0.05 level

** Significant at the 0.0I level

Table 42. Correlation Coefficients Between Separate Study Habits And Other Test Variables, Other Than Examinations, For Non Degree Course Males (n = I57) And Non Degree Course Females (n = 45)

Study Skill	Sex	Intell	Extra	Neur	Locus	A's	Anxiety	Motiv	Time	Concept
1	Male	0.776**	0.1002	-0.0354	-0.1327	-0.0224	-0.0287	0.0467	0.1052	0.0716
	Female	0.1938	-0.0421	-0.1781	0.1213	-0.1422	0.1881	0.0073	0.2396	0.1459
2	Male	0.0598	0.1505	-0.1055	-0.0603	0.1261	0.0576	0.0601	0.0228	0.0679
	Female	-0.0554	-0.2007	0.1362	-0.0340	-0.1800	0.2283	-0.0649	0.1732	0.0574
3	Male	-0.1119	0.0037	-0.0996	-0.1479	-0.0020	-0.0150	-0.1720	0.2444**	0.1834*
	Female	0.1417	-0.1686	-0.2646	-0.1536	-0.0340	0.1472	-0.2063	0.1635	0.2435
4	Male	0.1222	-0.0607	-0.0206	-0.1114	0.0713	-0.1155	-0.0667	-0.0428	0.1091
	Female	0.1700	-0.0176	-0.2812	0.0826	0.0967	-0.0253	-0.1662	0.2684	0.4644**
5	Male	-0.2030*	0.0362	-0.0055	-0.1782*	-0.0850	0.0182	-0.1450	0.1612*	0.0361
	Female	0.0187	-0.2034	-0.3406	-0.1606	0.1293	0.2134	-0.3201*	0.1880	0.1673
6	Male	-0.2103**	0.0278	0.0081	-0.0887	0.0101	-0.0564	-0.1660*	0.3430**	0.1468
	Female	0.1750	-0.0806	-0.1104	-0.1670	-0.0841	0.2640	-0.4854**	0.2906*	0.2050
7	Male	0.0341	-0.0170	-0.1351	-0.2270**	0.0136	0.0044	-0.0737	0.0698	-0.0009
	Female	0.1950	0.1469	-0.1846	-0.2671	-0.1069	0.2115	-0.3018*	0.0495	0.1746

* Significant at the 0.05 level

** Significant at the 0.0I level

NULL HYPOTHESIS ELEVEN, stated that :

No significant relationship exists between separate study habits and examination performance for (a) degree course and non degree course males and females, and, (b) all degree course and all non degree course students, and, (c) all male and all female students, and, (d) all male and all female students within each faculty, and, (e) the +otal sample of students.

Table 43. Correlation Coefficients Between Separate Study Habits And Examination Performance For Degree Course And Non Degree Course Males And Females; Degree Course And Non Degree Course Students; Male And Female Students; Total Sample

Study Skills	Degree Course			Non-Degree Course			All	All	All
	Males	Females	All	Males	Females	All	Males	Females	Students
	N=292	N=126	N=418	N=157	N=45	N=202	N=449	N=171	N=620
	'r'	'r'	'r'	'r'	'r'	'r'	'r'	'r'	'r'
1	0.100	0.210*	0.133**	0.023	0.264	0.073	0.073	0.244**	0.113*
2	0.141*	0.230**	0.168**	0.135	-0.002	0.114	0.139**	0.182*	0.149**
3	0.141*	0.279**	0.181**	0.007	0.144	0.031	0.097*	0.247**	0.134**
4	0.105	0.210*	0.135**	-0.058	0.159	-0.020	0.048	0.211**	0.085*
5	0.175**	0.364**	0.222**	0.056	0.176	0.077	0.133**	0.323**	0.174**
6	0.213**	0.229**	0.216**	0.036	0.141	0.054	0.152**	0.212**	0.164**
7	0.115*	0.058	0.100*	0.031	0.212	0.063	0.082	0.116	0.087*

* Significant at the 0.05 level

** Significant at the 0.0I level

Table 44. Correlation Coefficients Between Separate Study Habits And Examination Performance For Males And Females In Faculties I, 2 and 3, And For The Total Student Sample Within Each Faculty

Study Skill	Faculty 1			Faculty 2			Faculty 3		
	Males N=160 'r'	Females N=21 'r'	All N=181 'r'	Males N=140 'r'	Females N=130 'r'	All N=270 'r'	Males N=149 'r'	Females N=20 'r'	All N=169 'r'
1	-0.002	0.485*	0.064	0.075	0.092	0.111	0.158*	0.501*	0.204**
2	0.042	0.106	0.047	0.064	0.124	0.108	0.306**	0.481*	0.330**
3	0.039	0.312	0.071	0.100	0.102	0.136	0.134	0.682**	0.220**
4	-0.005	0.191	0.011	0.590**	0.192*	0.082	0.147	0.377	0.176*
5	0.108	0.248	0.124	0.070	0.245**	0.155	0.214**	0.626**	0.273**
6	0.196*	0.044	0.179*	-0.084	0.149	0.039	0.210**	0.559**	0.256**
7	-0.052	-0.054	-0.053	0.055	0.119	0.098	0.165*	0.266	0.177*

* Significant at the 0.05 level

** Significant at the 0.0I level

NULL HYPOTHESIS TWELVE, stated that :

No significant differences for frequencies of examination performance occur for (a) students classified according to sex and type of course pursued, and, (b) students classified according to sex and type of course pursued and their scores above and below the medians for combined study habits.

Table 45. Frequencies Of Students Classified According To Type Of Course And Sex, Falling Into Categories Of Exam Performance

Type of Course	Sex	Examination Category 0	1	2	3	4	Total	X^2	Sig. Level
Degree	Males	56	74	88	54	20	292		
	Females	10	29	58	27	2	126		
	Total	66	103	146	81	22	418	18.59	0.001
Non-Degree	Males	37	32	42	35	11	157		
	Females	9	5	25	5	1	45		
	Total	46	37	67	40	12	202	14.17	0.01

Table 46. Frequencies Of Combined Study Habits, Abcve And Below Their Medians, Falling Into Categories Of Examination Performance For Degree Course And Non Degree Course Students

Type of Course	Combined Scores	Examination Category 0	1	2	3	4	Total	X^2	Sig. Level
Degree	Above Med.	20	43	80	52	13	208		
Median = 190	Below Med.	46	60	66	29	9	210		
(Comb. Score)	Total	66	103	146	81	22	418	21.63	0.001
Non-Degree	Above Med.	17	24	29	19	8	97		
Median = 185	Below Med.	29	13	38	21	4	105		
(Comb. Score)	Total	46	37	67	40	12	202	8.58	NS

Table 47. Frequencies Of Combined Study Habits Above And Below Their Medians, Falling Into Categories Of Examination Performance For Degree Course And Non Degree Course Students, Classified According To Sex

Sex	Type of Course	Combined Scores	Examination Category 0	1	2	3	4	Total	X^2	Sig. Level
Males	Degree	Above Med.	19	28	53	32	12	144		
	Median = 188	Below Med.	37	46	35	22	8	148		
	(Comb. Score)	Total	56	74	88	54	20	292	15.81	0.01
Females	Degree	Above Med.	1	11	30	18	1	61		
	Median = 199	Below Med.	9	18	28	9	1	65		
	(Comb. Score)	Total	10	29	58	27	2	126	10.59	0.05
Males	Non-Degree	Above Med.	16	21	18	16	7	78		
	Median = 105	Below Med.	21	11	24	19	4	79		
	(Comb. Score)	Total	37	32	42	35	11	157	5.72	NS
Females	Non-Degree	Above Med.	1	3	14	3	1	22		
	Median = 178	Below Med.	8	2	11	2	0	23		
	(Comb. Score)	Total	9	5	15	5	1	45	*	NS

* Inappropriate for X^2 analysis since frequency in one cell is zero and the expected frequency is less than I. Consequently, for the Non degree course females, the Fisher exact probability test was calculated but showed no significant value for the rejection of the hypothesis that f. of exam performance is not related to f. of study habit scores above and below the combined study habits' median.

Varimax Rotated Factor Matrix For Sub Tests

Originally, a varimax rotation and oblique rotation analysis was done for the performance of the 620 student subjects on the 7 sub tests of study habits. The difficulty was that the number was too large to avoid an inevitable loading at significant levels. To eliminate the influence of the large sample size, a smaller sample of I50 student subjects' scores on the sub tests were subjected to a varimax rotational analysis.

The Burts-Banks formula was used to determine the significance levels for loadings on two extracted factors. The loadings on factors extracted from the sub tests I, 2, 3, 4, 5, 6 and 7 are shown in Table 48.

Table 48 Varimax Rotated Factor Matrix (n = I50)

Sub test	Factor I	Factor 2
I	0.003	0.033
2	0.404	0.720
3	0.486	0.428
4	0.626	0.36I
5	0.608	0.338
6	0.8I0	0.I23
7	0.7I6	0.II2

Apart from sub test I, all loadings on Factor I are significant at the 0.0I level, but for Factor 2, loadings are significant at the 0.00I level, only for sub tests 2, 3, 4 and 5.

Table 49 **Mean Differences Between Focusers And Scanners With Sex Held Constant For Neuroticism, Extraversion, Intelligence, Study Habits, Academic Self Concept And A Levels**

Variable	Sex	n	Category	Mean	SD	Mean diff.
Neuroticism	Males	52	Focusers	9.16	5.02	2.28*
	Males	24	Scanners	11.44	4.45	
Neuroticism	Females	30	Focusers	9.43	4.01	2.44*
	Females	14	Scanners	11.87	3.65	
Extraversion	Males	52	Focusers	13.65	3.55	0.45
	Males	24	Scanners	13.20	3.49	
Extraversion	Females	30	Focusers	13.63	3.53	0.96
	Females	14	Scanners	12.67	3.28	
Intelligence	Males	52	Focusers	116.01	9.98	2.95
	Males	24	Scanners	118.96	12.87	
Intelligence	Females	30	Focusers	116.45	9.95	4.85
	Females	14	Scanners	121.30	11.11	
Study Habits	Males	52	Focusers	194.98	31.86	7.99
	Males	24	Scanners	202.97	30.01	
Study Habits	Females	30	Focusers	197.33	30.09	7.08
	Females	14	Scanners	204.41	26.12	
Academic S.C.	Males	52	Focusers	21.18	3.26	1.60*
	Males	24	Scanners	19.58	3.12	
Academic S.C.	Females	30	Focusers	21.15	3.01	1.65*
	Females	14	Scanners	19.50	2.24	
A Levels	Males	52	Focusers	5.42	2.30	0.01
	Males	24	Scanners	5.41	2.19	
A Levels	Females	30	Focusers	5.50	2.26	0.43
	Females	14	Scanners	5.93	2.13	

* Significant at the 0.05 level

Table 50 Means And Standard Deviations Of Focusers And Scanners For Neuroticism, Extraversion, Intelligence, Study Habits, Academic Self Concept And A Levels

Variable	Focusers n = 82 Mean	SD	Scanners n = 38 Mean	SD	Mean Difference
Neuroticism	9.26	5.I3	II.60	5.62	2.34
Extraversion	I3.64	3.85	I3.00	3.75	0.64
Intelligence	II6.I7	9.96	II9.98	I3.2I	3.8I
Study Habits	I95.84	33.I8	I03.50	35.80	7.66
Academic S.C.	2I.I7	3.86	I9.55	4.94	I.62*
A Levels	5.45	2.27	5.60	2.I4	0.I5

* Sig. at the 0.05 level

Table 5I Frequencies Of Male And Female Students Falling Into Focusing And Scanning Categories

Category	Males	Females	Total
Focusers	52	30	82
Scanners	24	I4	38
Total	76	44	I20

X^2 = 0.026 for I df; N.Sig.

For the Focusers, significant correlations occurred between the following pairs of variables :

Combined Study Habits and Intelligence (0.44)
Extraversion and Academic Self Concept (0.32)
Neuroticism and Academic Self Concept (-0.29)
Neuroticism and A Levels (-0.28)

For the Scanners, there was a significant correlation between Combined Study Habits and Intelligence (0.44).

5.7 Summary Of Results

"It is a capital mistake to theorise before one has data."

(Arthur Conan Doyle, The Adventures of Sherlock Holmes.)

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
I. No sig. differ. in INTELLIGENCE exists between the sexes when classified into various groups	I. Total	Moray House Verbal Reasoning Test	"t" test	Sig.	Females	Rejected
	2. All degree			N.Sig.	-	Accepted
	3. All non degree			Sig.	Females	Rejected
	4. All Fac I			Sig.	Females	Rejected
	All Fac 2			Sig.	Females	Rejected
	All Fac 3			N.Sig.	-	Accepted
	5. Fac I degree			Sig.	Females	Rejected
	non deg.			N.Sig.	-	Accepted
	Fac 2 degree			Sig.	Females	Rejected
	non deg.			N.Sig.	-	Accepted
	Fac 3 degree			N.Sig.	-	Accepted
	non deg.			N.Sig.	-	Accepted
2. No sig. differ. in EXTRAVERSION exists between the sexes when classified into various groups	I. Total	EPI		N.Sig.	-	Accepted
	2. All degree			N.Sig.	-	Accepted
	3. All non degree			N.Sig.	-	Accepted
	4. All Fac I			N.Sig.	-	Accepted
	All Fac 2			N.Sig.	-	Accepted
	All Fac 3			N.Sig.	-	Accepted
	5. Fac I degree			N.Sig.	-	Accepted
	non deg.			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
	Fac 2 degree	E.P.I.	"t" test	N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted
	Fac 3 degree			N.Sig.	-	Accepted
	non degree			Sig.	Male	Rejected
No sig. differ. in NEUROTICISM exists between the sexes when classified into various groups	I. Total	E.P.I.	"t" test	Sig.	Female	Rejected
	2. All degree			Sig.	Female	Rejected
	3. All non degree			N.Sig.	-	Accepted
	4. All Fac I			N.Sig.	-	Accepted
	All Fac 2			N.Sig.	-	Accepted
	All Fac 3			N.Sig.	-	Accepted
	5. Fac I degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted
	Fac 2 degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted
	Fac 3 degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
No sig. differ. in LOCUS OF CONTROL exists between the sexes classified into various groups	I. Total	Rotter's Internal v's External Locus Of Control Scale	"t" tests	N.Sig.	-	Accepted
	2. All degree			Sig.	Female	Rejected
	3. All non degree			N.Sig.	-	Accepted
	4. All Fac I			N.Sig.	-	Accepted
	All Fac 2			N.Sig.	-	Accepted
	All Fac 3			N.Sig.	-	Accepted
	5. Fac I degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted
	Fac 2 degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted
	Fac 3 degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted
No sig. differ. in ACADEMIC SELF CONCEPT exists between the sexes classified into various groups	I. Total	Brookover's Academic Self Concept Scale	"t" tests	N.Sig.	-	Accepted
	2. All degree			N.Sig.	-	Accepted
	3. All non degree			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
			"t" test	N.Sig.	-	Accepted
	4. All Fac I	Brookover's Academic Self Concept Scale		N.Sig.	-	Accepted
	All Fac 2			N.Sig.	-	Accepted
	All Fac 3					
	5. Fac I degree			Sig.	Males	Rejected
	non degree			N.Sig.	-	Accepted
	Fac 2 degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted
	Fac 3 degree			N.Sig.	-	Accepted
	non degree			Sig.	Males	Rejected
No sig. differ. in A LEVELS exist between the sexes classified into various groups	I. Total	G.C.E. exams	"t" tests	Sig.	Females	Rejected
	2. All degree			N.Sig.	-	Accepted
	3. All non degree			N.Sig.	-	Accepted
	4. All Fac I			N.Sig.	-	Accepted
	All Fac 2			N.Sig.	-	Accepted
	All Fac 3			N.Sig.	-	Accepted
	5. Fac I degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted
	Fac 2 degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted
	Fac 3 degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
For the total sample of subjects and for the various groups classified according to faculty membership and type of course pursued, no sig. differ. in ANXIETY occur		University of London Questionnaire	"t" test	N.Sig.	-	Accepted
For the total sample of subjects and for the various groups classified according to faculty membership and type of course pursued, no sig. differ. in MOTIVATION occur		"	"	N.Sig.	-	Accepted
No sig. differ. in TIME SPENT STUDYING exist between the sexes classified into various groups	I. Total	Study Time Log	"t" test	N.Sig.	-	Accepted
	2. All degree			N.Sig.	-	Accepted
	3. All non degree			N.Sig.	-	Accepted
	4. All Fac I			N.Sig.	-	Accepted
	All Fac 2			Sig.	Female	Rejected
	All Fac 3			Sig.	Female	Rejected
	5. Fac I degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted
	Fac 2 degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted
	Fac 3 degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
No sig. differ. in COMBINED STUDY HABITS scores between the sexes classified into various sub groups	I. Total	SHEIK	"t" test	N.Sig.	-	Accepted
	2. All degree			Sig.	Female	Rejected
	3. All non degree			N.Sig.	-	Accepted
	4. All Fac I			N.Sig.	-	Accepted
	All Fac 2			Sig.	Female	Rejected
	All Fac 3			N.Sig.	-	Accepted
	5. Fac I degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted
	Fac 2 degree			Sig.	Female	Rejected
	non degree			N.Sig.	-	Accepted
	Fac 3 degree			N.Sig.	-	Accepted
	non degree			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
2. No sig, differ. in INTELLIGENCE exists between the faculties when classified into various groups	I. Total	Moray House Verbal Reasoning Test (Adult) I	"t" test	Sig.	Fac I&II	Rejected
	2. Fac I v Fac I			N.Sig.	-	Accepted
	Fac I v Fac 3			Sig.	Fac I	Rejected
	Fac 2 v Fac 3			Sig.	Fac 2	Rejected
	3. All M v All F			N.Sig.	-	Accepted
	4. Fac I v Fac 2					
	all degree			Sig.	Fac 2	Rejected
	degree M			Sig.	Fac I	Rejected
	degree F			Sig.	Fac I	Rejected
	all non degree			Sig.	Fac I	Rejected
	non degree M			Sig.	Fac 2	Rejected
	non degree F			N.Sig.	-	Accepted
	5. Fac 2 v Fac 3					
	all degree			N.Sig.	-	Accepted
	degree M			Sig.	Fac 2	Rejected
	degree F			N.Sig.	-	Accepted
	all non degree			Sig.	Fac 2	Rejected
	non degree M			Sig.	Fac 2	Rejected
	non degree F			Sig.	Fac 2	Rejected
	6. Fac I v Fac 3					
	all degree			Sig.	Fac I	Rejected
	degree M			Sig.	Fac I	Rejected
	degree F			Sig.	Fac I	Rejected
	all non degree			Sig.	Fac I	Rejected
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
No sig. differ. in EXTRAVERSION exist between the faculties when classified into various groups	I. Total	E.P.I.	"t" test	N.Sig.	-	Accepted
	2. Fac I v Fac 2			Sig.	Fac I	Rejected
	Fac I v Fac 3			N.Sig.	-	Accepted
	Fac 2 v Fac 3			N.Sig.	-	Accepted
	3. Fac I v Fac 2					
	all Males			Sig.	Fac I	Rejected
	all Females			N.Sig.	-	Accepted
	all degree			Sig.	Fac 2	Rejected
	degree M			Sig.	Fac 2	Rejected
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted
	4. Fac I v Fac 3					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			Sig.	Fac 3	Rejected
	non degree F			N.Sig.	-	Accepted
	5. Fac 2 v Fac 3					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
	all non degree			N.Sig.	-	Accepted
	non degree M	E.P.I.	"t" test	N.Sig.	-	Accepted
	non degree F			Sig.	Fac 2	Rejected
No sig. differ. in NEUROTICISM exist between the faculties when classified into various groups	I.Total	E.P.I.	"t" test	N.Sig.	-	Accepted
	2. Fac I v Fac 2			Sig.	Fac 2	Rejected
	Fac I v Fac 3			N.Sig.	-	Accepted
	Fac 2 v Fac 3			Sig.	Fac 2	Accepted
	3. Fac I v Fac 2					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			Sig.	Fac 2	Rejected
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted
	4. Fac I v Fac 3					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
	5. Fac 2 v Fac 3	E.P.I.	"t" test			
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted
No sig. differ. in LOCUS OF CONTROL exist between the faculties when classified into various groups	I. Total	Rotter's Internal v's External Locus Of Control Scale	"t" test	N.Sig.	-	Accepted
	2. Fac I v Fac 2			Sig.	Fac 2	Rejected
	Fac I v Fac 3			Sig.	Fac 2	Rejected
	Fac 2 v Fac 3			N.Sig.	-	Accepted
	3. Fac I v Fac 2					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			Sig.	Fac 2	Rejected
	non degree M			Sig.	Fac 2	Rejected
	non degree F			Sig.	Fac 2	Rejected
	4. Fac I v Fac 3					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
	all non degree	Rotter's Internal v's External Locus	"t" test	N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted
	5. Fac 2 v Fac 3					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			Sig.	Fac 3	Rejected
	non degree M			Sig.	Fac 2	Rejected
	non degree F			N.Sig.	-	Accepted
No sig. differ. in ACADEMIC SELF CONCEPT exist between the faculties when classified into various groups	I. Total	Brookover's Academic Self Concept Scale	"t" test	N.Sig.	-	Accepted
	2. Fac I v Fac 2			Sig.	Fac 2	Rejected
	Fac I v Fac 3			N.Sig.	-	Accepted
	Fac 2 v Fac 3			N.Sig.	-	Accepted
	3. Fac I v Fac 2					
	all Males			Sig.	Fac 2	Rejected
	all Females			Sig.	Fac 2	Rejected
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			Sig.	Fac 2	Rejected
	all non degree			Sig.	Fac 2	Rejected
	non degree M			N.Sig.	-	Accepted
	non degree F			Sig.	Fac 2	Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
	4. Fac I v Fac 3	Brookover's	"t" test			
	all Males	Academic Self		Sig.	Fac 3	Rejected
	all Females	Concept Scale		N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			Sig.	Fac 3	Rejected
	non degree M			Sig.	Fac 3	Rejected
	non degree F			N.Sig.	-	Accepted
	5. Fac 2 v Fac 3					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			Sig.	Fac 3	Rejected
No sig. differ. in A LEVELS exists between faculties when classified into various groups	I. Total	G.C.E. exams	"t" test	N.Sig.	-	Accepted
	2. Fac I v Fac 2			N.Sig.	-	Accepted
	Fac I v Fac 3			Sig.	Fac 3	Rejected
	Fac 2 v Fac 3			N.Sig.	-	Accepted
	3. Fac I v Fac 2					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC	RESULTS	DIRECTION	EVALUATION
	all non degree	G.C.E. exams	"t" test	N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted
	4. Fac I v Fac 3					
	all Males			Sig.	Fac 3	Rejected
	all Females			N.Sig.	-	Accepted
	all degree			Sig.	Fac 3	Rejected
	degree M			Sig.	Fac 3	Rejected
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F					
	5. Fac 2 v Fac 3					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted
No sig. differ. in ANXIETY exists between faculties when classified into various groups	I. Total	University of London Questionnaire	"t" test	N.Sig.	-	Accepted
	2. Fac I v Fac 2			Sig.	Fac I	Rejected
	Fac I v Fac 3			N.Sig.	-	Accepted
	Fac 2 v Fac 3			Sig.	Fac 3	Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
	3. Fac I v Fac 2					
	all Males	University of London Questionnaire	"t" test	Sig.	Fac I	Rejected
	all Females			N.Sig.	-	Accepted
	all degree			Sig.	Fac I	Rejected
	degree M			Sig.	Fac I	Rejected
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted
	4. Fac I v Fac 3					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted
	5. Fac 2 v Fac 3					
	all Males			Sig.	Fac 3	Rejected
	all Females			N.Sig.	-	Accapted
	all degree			Sig.	Fac 3	Rejected
	degree M			Sig.	Fac 3	Rejected
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
For the total sample of subjects and for the various groups classified according to sex and type of course pursued, no sig. differ. in MOTIVATION within faculties occur		University of London Questionnaire	"t" test	N.Sig.	-	Accepted
No sig. differ in ACADEMIC SELF CONCEPT exists between faculties when classified into various groups	I. Total	Rotter's Internal v's External Locus of Control	"t" test	N.Sig.	-	Accepted
	2. Fac I v Fac 2			Sig.	Fac 2	Rejected
	Fac I v Fac 3			N.Sig.	-	Accepted
	Fac 2 v Fac 3			N.Sig.	-	Accepted
	3. Fac I v Fac 2					
	all Males			Sig.	Fac 2	Rejected
	all Females			Sig.	Fac 2	Rejected
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			Sig.	Fac 2	Rejected
	all non degree			Sig.	Fac 2	Rejected
	non degree M			N.Sig.	-	Accepted
	non degree F			Sig.	Fac 2	Rejected
	4. Fac I v Fac 3					
	all Males			Sig.	Fac 3	Rejected
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
	all non degree	Rotter's Internal v's External Locus of Control	"t" test	Sig.	Fac 3	Rejected
	non degree M			Sig.	Fac 3	Rejected
	non degree F			N.Sig.	-	Accepted
	4. Fac 2 v Fac 3					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			Sig.	Fac 3	Rejected
No sig. differ. in TIME SPENT STUDYING exists between faculties when classified into various groups	I. Fac I v Fac 2	Time Study Log	"t" test	Sig.	Fac I	Rejected
	Fac I v Fac 3			N.Sig.	-	Accepted
	Fac 2 v Fac 3			Sig.	Fac 3	Rejected
	2. Fac I v Fac 2					
	all Males			Sig.	Fac I	Rejected
	all Females			N.Sig.	-	Accepted
	all degree			Sig.	Fac I	Rejected
	degree M			Sig.	Fac I	Rejected
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
	3. Fac I v Fac 2	Time Study Log	"t" test			
	all Males			N.Sig.	--	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			Sig.	Fac 3	Rejected
	all non degree			N.Sig.	-	Accepted
	non degree M			Sig.	Fac 3	Rejected
	non degree F			N.Sig.	-	Accepted
	4. Fac 2 v Fac 3					
	all Males			Sig.	Fac 3	Rejected
	all Females			Sig.	Fac 3	Rejected
	all degree			N.Sig.	-	Accepted
	degree M			Sig.	Fac 2	Rejected
	degree F			Sig.	Fac 3	Rejected
	all non degree			Sig.	Fac 3	Rejected
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted
No sig. differ. in COMBINED STUDY HABITS exists bet between faculties when classified into various groups	I. Fac I v Fac 2	SHEIK	"t" test	N.Sig.	-	Accepted
	Fac I v Fac 3			N.Sig.	-	Accepted
	Fac 2 v Fac 3			Sig.	Fac 3	Rejected
	2. Fac I v Fac 2					
	all Males			Sig.	Fac I	Rejected
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
	all non degree	SHEIK	"t" test	Sig.	Fac I	Rejected
	non degree M			Sig.	Fac I	Rejected
	non degree F			N.Sig.	-	Accepted
	3. Fac I v Fac 3					
	all Males			N.Sig.	-	Accepted
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			N.Sig.	-	Accepted
	non degree M			N.Sig.	-	Accepted
	non degree F			N.Sig.	-	Accepted
	4. Fac 2 v Fac 3					
	all Males			Sig.	Fac 3	Rejected
	all Females			N.Sig.	-	Accepted
	all degree			N.Sig.	-	Accepted
	degree M			N.Sig.	-	Accepted
	degree F			N.Sig.	-	Accepted
	all non degree			Sig.	Fac 3	Rejected
	non degree M			Sig.	Fac 3	Rejected
	non degree F			Sig.	Fac 3	Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
3. No sig. differ. in INTELLIGENCE exists between degree and non degree course students classified into various groups	I. Degree v Non degree	Moray House Verbal Reasoning Test (Adult) I	"t" test	Sig.	Degree	Rejected
	2. Fac I					
	all deg v non deg			Sig.	Degree	Rejected
	M deg v M non deg			Sig.	Degree	Rejected
	F deg v F non deg			Sig.	Degree	Rejected
	3. Fac 2					
	all deg v non deg			Sig.	Degree	Rejected
	M deg v M non deg			Sig.	Degree	Rejected
	F deg v F non deg			Sig.	Degree	Rejected
	4. Fac 3					
	all deg v non deg			Sig.	Degree	Rejected
	M deg v M non deg			Sig.	Degree	Rejected
	F deg v F non deg			N.Sig.	-	Accepted
No sig. differ. in EXTRAVERSION exists between degree and non degree course students when classified into various groups	I. Degree v Non degree	E.P.I.	"t" test	Sig.	Degree	Rejected
	2. Fac I					
	all deg v non deg			N.Sig.	-	Accepted
	M deg v M non deg			N.Sig.	-	Accepted
	F deg v F non deg			N.Sig.	-	Accepted
	3. Fac 2					
	all deg v non deg			N.Sig.	-	Accepted
	M deg v M non deg			N.Sig.	-	Accepted
	F deg v F non deg			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
	4. Fac 3	E.P.I.	"t" test			
	all deg v non deg			Sig.	Non deg	Rejected
	M deg v M non deg			Sig.	Non deg	Rejected
	F deg v F non deg			Sig.	Non deg	Rejected
No sig. differ. in NEUROTICISM exists between degree and non degree course students classified into various groups		E.P.I.	"t" test	N.Sig.	-	Accepted
No sig. differ. in LOCUS OF CONTROL exists between degree and non degree course students when classified into various groups	I. Degree v Non deg	Rotter's Internal v's External Locus of Control	"t" test	N.Sig.	-	Accepted
	2. Fac I					
	all deg v non deg			N.Sig.	-	Accepted
	M deg v M non deg			N.Sig.	-	Accepted
	F deg v F non deg			N.Sig.	-	Accepted
	3. Fac 2					
	all deg v non deg			N.Sig.	-	Accepted
	M deg v M non deg			Sig.	Non deg	Rejected
	F deg v F non deg			N.Sig.	-	Accepted
	4. Fac 3					
	all deg v non deg			N.Sig.	-	Accepted
	M deg v M non deg			N.Sig.	-	Accepted
	F deg v F non deg			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
No sig, differ. in A LEVELS exists between degree and non course students when classified into various groups	I. Degree v Non degree	G.C.E. exams	"t" test	Sig.	Degree	Rejected
	2. Fac I					
	all deg v non deg			Sig.	Degree	Rejected
	M deg v M non deg			Sig.	Degree	Rejected
	F deg v F non deg			N.Sig.	-	Accepted
	3. Fac 2					
	all deg v non deg			Sig.	Degree	Rejected
	M deg v M non deg			Sig.	Degree	Rejected
	F deg v F non deg			Sig.	Degree	Rejected
	4. Fac 3					
	all deg v non deg			Sig.	Degree	Rejected
	M deg v M non deg			Sig.	Degree	Rejected
	F deg v F non deg			Sig.	Degree	Rejected
	5. Fac 3					
	all deg v non deg			Sig.	Degree	Rejected
	M deg v M non deg			Sig.	Degree	Rejected
	F deg v F non deg			Sig.	Degree	Rejected
No sig. differ. in ANXIETY exists between degree course and non degree course students when classified into various groups		University of London Questionnaire	"t" test	N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
No sig. differ. in MOTIVATION exists between degree course and non degree course students when classified into various groups		University of London Questionnaire	"t" test	N.Sig.	-	Accepted
No sig. differ. in ACADEMIC SELF CONCEPT exists between degree course and non degree course students when classified into various groups		Brookover's Academic Self Concept Scale	"t" test	N.Sig.	-	Accepted
No sig. differ. in TIME SPENT STUDYING exists between degree and non degree course students when classified into various groups	I. Degree v Non degree	Time Study Log	"t" test	Sig.	Degree	Rejected
	2. Fac I					
	all deg v non deg			Sig.	Degree	Rejected
	M deg v M non deg			Sig.	Degree	Rejected
	F deg v F non deg			N.Sig.	-	Accepted
	3. Fac 2					
	all deg v non deg			N.Sig.	-	Accepted
	M deg v M non deg			N.Sig.	-	Accepted
	F deg v F non deg			N.Sig.	-	Accepted
	4. Fac 3					
	all deg v non deg			N.Sig.	-	Accepted
	M deg v M non deg			N.Sig.	-	Accepted
	F deg v F non deg			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
No sig. differ. in COMBINED STUDY HABITS exists between degree and non degree course students when classified into various groups	I. Degree v Non degree	SHEIK	"t" test	Sig.	Degree	Rejected
	2. Fac I					
	all deg v non deg			N.Sig.	-	Accepted
	M deg v M non deg			N.Sig.	-	Accepted
	F deg v F non			Sig.	Degree	Rejected
	3. Fac 2					
	all deg v non deg			Sig.	Degree	Rejected
	M deg v M non deg			Sig.	Degree	Rejected
	F deg v F non deg			Sig.	Degree	Rejected
	4. Fac 3					
	all deg v non deg			N.Sig.	-	Accepted
	M deg v M non deg			N.Sig.	-	Accepted
	F deg v F non deg			N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
4. No sig. differ. exist between Males and Females in each faculty for performance on the SUB TESTS of STUDY HABITS	I. Fac I all M v all F	Sub Tests of SHEIK I	"t" test	N.Sig.	-	Accepted
		2		N.Sig.	-	Accepted
		3		Sig.	Females	Rejected
		4		N.Sig.	-	Accepted
		5		N.Sig.	-	Accepted
		6		N.Sig.	-	Accepted
		7		N.Sig.	-	Accepted
	2. Fac 2 all M v all F	I		Sig.	Females	Rejected
		2		N.Sig.	-	Accepted
		3		Sig.	Females	Rejected
		4		Sig.	Females	Rejected
		5		Sig.	Females	Rejected
		6		N.Sig.	-	Accepted
		7		N.Sig.	-	Accepted
	3. Fac 3 all M v all F	I		N.Sig.	-	Accepted
		2		N.Sig.	-	Accepted
		3		N.Sig.	-	Accepted
		4		M.Sig.	-	Accepted
		5		N.Sig.	-	Accepted
		6		N.Sig.	-	Accepted
		7		N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
5. No sig. differ. exist between students of different faculties for performance on the SUB TESTS of STUDY HABITS	I. Fac I v Fac 2	Sub Tests of SHEIK				
		I	"t" test	N.Sig.	-	Accepted
		2		N.Sig.	-	Accepted
		3		N.Sig.	-	Accepted
		4		N.Sig.	-	Accepted
		5		M.Sig.	-	Accepted
		6		Sig.	Fac I	Rejected
		7		Sig.	Fac I	Rejected
	2. Fac I v Fac 3	I		N.Sig.	-	Accepted
		2		N.Sig.	-	Accepted
		3		Sig.	Fac 3	Rejected
		4		N.Sig.	-	Accepted
		5		N.Sig.	-	Accepted
		6		N.Sig.	-	Accepted
		7		N.Sig.	-	Accepted
	3. Fac 2 v Fac 3	I		N.Sig.	-c	Accepted
		2		N.Sig.	-	Accepted
		3		Sig.	Fac 3	Rejected
		4		N.Sig.	-	Accepted
		5		N.Sig.	-	Accepted
		6		Sig.	Fac 3	Rejected
		7		Sig.	Fac 3	Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT PROC.	RESULTS	DIRECTION	EVALUATION
. No sig. differ. exist within faculties between degree course and non degree course students	I. Fac I v Fac 2 non degree courses	Sub Tests of SHEIK				
		I	"t" test	Sig.	Fac I	Rejected
		2		Sig.	Fac I	Rejected
		3		N.Sig.	-	Accepted
		4		Sig.	Fac I	Rejected
		5		N.Sig.	-	Accepted
		6		Sig.	Fac I	Rejected
		7		Sig.	Fac I	Rejected
	2. Fac I v Fac 3 non degree courses	I		N.Sig.	-	Accepted
		2		N.Sig.	-	Accepted
		3		Sig.	Fac 3	Rejected
		4		N.Sig.	-	Accepted
		5		N.Sig.	-	Accepted
		6		N.Sig.	-	Accepted
		7		N.Sig.	-	Accepted
	3. Fac 2 v Fac 3 non degree courses	I		Sig.	Fac 3	Rejected
		2		Sig.	Fac 3	Rejected
		3		Sig.	Fac 3	Rejected
		4		N.Sig.	-	Accepted
		5		Sig.	Fac 3	Rejected
		6		Sig.	Fac 3	Rejected
		7		Sig.	Fac 3	Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
6. No sig. differ. exist within faculties betw. degree course and non degree course students	I. Fac I v Fac 2 degree courses	Sub Tests of SHEIK				
		I	"t" test	Sig.	Fac 2	Rejected
		2		N.Sig.	-	Accepted
		3		N.Sig.	-	Accepted
		4		Sig.	Fac 2	Rejected
		5		N.Sig.	-	Accepted
		6		N.Sig.	-	Accepted
		7		Sig.	Fac I	Rejected
	2. Fac I v Fac 3 degree courses					
		I		N.Sig.	-	Accepted
		2		N.Sig.	-	Accepted
		3		Sig.	Fac 3	Rejected
		4		N.Sig.	-	Accepted
		5		N.Sig.	-	Accepted
		6		N.Sig.	-	Accepted
		7		N.Sig.	-	Accepted
	3. Fac 2 v Fac 3 degree courses					
		I		N.Sig.	-	Accepted
		2		N.Sig.	-	Accepted
		3		Sig.	Fac 3	Rejected
		4		N.Sig.	-	Accepted
		5		N.Sig.	-	Accepted
		6		N.Sig.	-	Accented
		7		N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
		Sub Tests of SHEIK				
	I. Fac I degree and non degree courses	I	"t" test	N.Sig.	-	Accepted
		2		N.Sig.	-	Accepted
		3		N.Sig.	-	Accepted
		4		Sig.	Non degree	Rejected
		5		N.Sig.	-	Accepted
		6		N.Sig.	-	Accepted
		7		N.Sig.	-	Accepted
	2. Fac 2 degree and non degree courses	I		Sig.	degree	Rejected
		2		Sig.	degree	Rejected
		3		N.Sig.	-	Accepted
		4		Sig.	degree	Rejected
		5		Sig.	degree	Rejected
		6		Sig.	degree	Rejected
		7		Sig.	degree	Rejected
	3. Fac 3 degree and non degree courses	I		N.Sig.	-	Accepted
		2		N.Sig.	-	Accepted
		3		N.Sig.	-	Accepted
		4		N.Sig.	-	Accepted
		5		N.Sig.	-	Accepted
		6		N.Sig.	-	Accepted
		7		N.Sig.	-	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
7. No sig. differ. exist between STUDY HABITS SCORES of students when tested INITIALLY and AFTER a period of one year	I. T_I v T_2	SHEIK	"t" test	N.Sig.	-	Accepted
8. No sig. relatr. ionship exists between INITIAL STUDY HABITS SCORES and LATER SCORES after a period of I year	2. T_I v T_2	SHEIK	r	Sig.		Rejected
9. No sig. relat- ionship exists between the COMBINED STUDY HABITS and the variables of Intelligence A Levels Extraversion Neuroticism Locus of control	3. All degree	M.H.V.R. Test G.C.E. E.P.I. E.P.I. Rotter's I.E.	r r r r r	N.Sig. N.Sig. Sig. Sig. Sig.		Accepted Accepted Rejected Rejected Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
Anxiety		Univ. London Qu.	r	Sig.		Rejected
Academic S.C.		Brookover's A.S.C	r	Sig.		Rejected
Motivation		Univ. London Qu.	r	Sig.		Rejected
Time		Time Log	r	Sig.		Rejected
Examinations		Exam results	r	Sig.		Rejected
Intelligence	2. All non degree	M.H.V.R. Test	r	N.Sig.		Accepted
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	N.Sig.		Accepted
Neuroticism		E.P.I.	r	N.Sig.		Accepted
Locus of control		Rotter's I.E.	r	Sig.		Rejected
Anxiety		Univ. London Qu.	r	Sig.		Rejected
Academic S.C.		Brookover's A.D.C	r	N.Sig.		Accepted
Motivation		Univ. London Qu.	r	Sig.		Rejected
Time		Time Log	r	Sig.		Rejected
Examinations		Exam results	r	N.Sig.		Accepted
Intelligence	3. Degree course M	M.H.V.R. Test	r	N.Sig.		Accepted
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	Sig.		Rejected
Neuroticism		E.P.I.	r	Sig.		Rejected
Locus of control		Rotter's I.E.	r	Sig.		Rejected
Academic S.C.		Brookover's S.C.	r	Sig.		Rejected
Anxiety		Univ. London Qu.	r	Sig.		Rejected
Motivation		Univ. London Qu.	r	Sig.		Rejected
Time		Time Log	r	Sig.		Rejected
Examinations		Exam results	r	Sig.		Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
Intelligence	4. Degree course F	M.H.V.R. Test	r	N.Sig.		Accepted
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	N.Sig.		Accepted
Neuroticism		E.P.I.	r	Sig.		Rejected
Locus of control		Rotter's I.E.	r	N.Sig.		Accepted
Academic S.C.		Brookover A.S.C.	r	Sig.		Rejected
Anxiety		London Univ. Ques	r	Sig.		Rejected
Motivation		London Univ. Qu.	r	Sig.		Rejected
Time		Time Log	r	N.Sig.		Accepted
Examinations		Exam results	r	Sig.		Rejected
Intelligence	5. Non degree M	M.H.V.R. Test	r	N.Sig.		Accepted
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	N.Sig.		Accepted
Neuroticism		E.P.I.	r	N.Sig.		Accepted
Locus of control		Rotter's I.E.	r	Sig.		Rejected
Academic S.C.		Brookover's A.S.C.	r	N.Sig.		Accepted
Anxiety		London Univ. Qu.	r	N.Sig.		Accepted
Motivation		London Univ. Qu.	r	N.Sig.		Accepted
Time		Time Log	r	Sig.		Rejected
Examinations		Exam results	r	N.Sig.		Accepted
Intelligence	6. Non degree F	M.H.V.R. Test	r	N.Sig.		Accepted
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	N.Sig.		Accepted
Neuroticism		E.P.I.	r	N.Sig.		Accepted
Locus of control		Rotter's I.E.	r	N.Sig.		Accepted
Academic S.C.		Brookover's A.S.C.	r	Sig.		Rejected
Anxiety		Univ.London Qu.	r	N.Sig.		Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
Motivation		Univ. London Qu.	r	Sig.		Rejected
Time		Time Log	r	Sig.		Rejected
Examinations		Exam results	r	N.Sig.		Accepted
Intelligence	7. Fac I. Males	M.H.V.R. Test	r	N.Sig.		Accepted
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	N.Sig.		Accepted
Neuroticism		E.P.I.	r	Sig.		Rejected
Locus of control		Rotter's I.E.	r	Sig.		Rejected
Academic S.C.		Brookover's A.S.C.	r	N.Sig.		Accepted
Anxiety		Univ. London Qu.	r	Sig.		Rejected
Motivation		Univ. London Qu.	r	Sig.		Rejected
Time		Time Log	r	Sig.		Rejected
Examinations		Exam results	r	N.Sig.		Accepted
Intelligence	8. Fac I. Total	M.H.V.R. Test	r	N.Sig.		Accepted
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	N.Sig.		Accepted
Neuroticism		E.P.I.	r	Sig.		Rejected
Locus of control		Rotter's I.E.	r	Sig.		Rejected
Academic S.C.		Brookover's A.S.C.	r	N.Sig.		Accepted
Anxiety		Univ. London Qu.	r	Sig.		Rejected
Motivation		Univ. London Qu.	r	Sig.		Rejected
Time		Time Log	r	Sig.		Rejected
Examinations		Exam results	r	N.Sig.		Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
No sig. correlations obtain for Fac I. Females			r			Accepted
Intelligence	IO. Fac 2. Males	M.H.V.R. Test	r	N.Sig.		Accepted
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	N.Sig.		Accepted
Neuroticism		E.P.I.	r	N.Sig.		Accepted
Locus of control		Rotter's I.E.	r	N.Sig.		Accepted
Academic S.C.		Brookover's A.S.C	r	Sig.		Rejected
Anxiety		Univ. London Qu.	r	Sig.		Rejected
Motivation		Univ. London Qu.	r	Sig.		Rejected
Time		Time Log	r	Sig.		Rejected
Examinations		Exam results	r	N.Sig.		Accepted
Intelligence	II. Fac 2. Females	M.H.V.R. Test	r	N.Sig.		Accepted
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	N.Sig.		Accepted
Neuroticism		E.P.I.	r	N.Sig.		Accepted
Locus of control		Rotter's I.E.	r	N.Sig.		Accepted
Academic S.C.		Brookover's A.S.C.	r	N.Sig.		Accepted
Anxiety		Univ. London Qu.	r	Sig.		Rejected
Motivation		Univ. London Qu.	r	Sig.		Rejected
Time		Time Log	r	Sig.		Rejected
Examinations		Exam results	r	Sig.		Rejected
Intelligence	I2. Fac 2. Total	M.H.V.R. Test	r	N.Sig.		Accepted
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	N.Sig.		Accepted
Neuroticism		E.P.I.	r	N.Sig.		Accepted
Locus of control		Rotter's I.E.	r	N.Sig.		Accepted
Academic S.C.		Brookover's A.S.C.	r	N.Sig.		Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
Anxiety		Univ. London Qu.	r	Sig.		Rejected
Motivation		Univ. London Qu.	r	Sig.		Rejected
Time		Time Log	r	Sig.		Rejected
Examinations		Exam results	r	N.Sig.		Accepted
Intelligence	I3. Fac 3. Males	M.H.V.R. Test	r	Sig.		Rejected
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	N.Sig.		Accepted
Neuroticism		E.P.I.	r	N.Sig.		Accepted
Locus of control		Rotter's I.E.	r	N.Sig.		Accepted
Academic S.C.		Brookover's A.S.C	r	Sig.		Rejected
Anxiety		Univ. London Qu.	r	N.Sig.		Accepted
Motivation		Univ. London Qu.	r	Sig.		Rejected
Time		Time Log	r	N.Sig.		Accepted
Examinations		Exam results	r	Sig.		Rejected
Intelligence	I4. Fac 3. Females	M.H.V.R. Test	t	N.Sig.		Accepted
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	N.Sig.		Accepted
Neuroticism		E.P.I.	r	N.Sig.		Accepted
Locus of control		Rotter's I.E.	r	N.Sig.		Accepted
Academic S.C.		Brookover's A.S.C	r	Sig.		Rejected
Anxiety		Univ. London Qu.	r	N.Sig.		Accepted
Motivation		Univ. London Qu.	r	Sig.		Rejected
Time		Time Log	r	N.Sig.		Accepted
Examinations		Exam results	r	Sig.		Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
Intelligence	I5. Fac 3. Total	M.H.V.R. Test	r	Sig.		Rejected
A Levels		G.C.E.	r	N.Sig.		Accepted
Extraversion		E.P.I.	r	N.Sig.		Accepted
Neuroticism		E.P.I.	r	N.Sig.		Accepted
Locus of control		Rotter's I.E.	r	N.Sig.		Accepted
Academic S.C.		Brookover's A.S.C	r	Sig.		Rejected
Anxiety		Univ. London Qu.	r	N.Sig.		Accepted
Motivation		Univ. London Qu.	r	Sig.		Rejected
Time		Time Log	r	N.Dig.		Accepted
Examinations		Exam results	r	Sig.		Rejected
I0. No sig. relat- ionship exists between STUDY HABITS and the VARIABLES						
Intelligence	I. Degree course	M.H.V.R. Test	r	Sig.		
A Levels		G.C.E.		SH I and		
Extraversion		E.P.I.		Anxiety		
Neuroticism		E.P.I.		Motivn.		
Locus of control		Rotter's I.E.		Acad.SC.		Rejected
Academic S.C.		Brookover's A.S.C.				
Anxiety		Univ. London Qu.		SH 2 and		
Motivation		Univ. London Qu.		Neurot.		
Time		Time Log		Motivn.		
Examinations		Exam results		Acad. SC		Rejected
				SH 3 and		
				Intell.		
				Extrav.		
				Neurot.		
				Anxiety		Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
Intelligence A Levels Extraversion Neuroticism Locus of control Academic S.C. Anxiety Motivation Time Examinations		M.H.V.R. Test G.C.E. E.P.I. E.P.I. Rotter's I.E. Brookover's A.S.C Univ. London Qu. Univ. London Qu. Time Log Exam results	r	Motivn. Acad.SC Time		Rejected
				SH 4 and Neurot. Anxiety Motivn. Time Acad.SC		Rejected
				SH 5 and Neurot. Anxiety Motivn. Time Acad.SC		Rejected
				SH 6 and Intell. Extrav. Neurot. Locus of C Acad.SC Motivn. Time Exam		Rejected
				SH 7 and Intell. Locus of C Motivn. Time Acad.SC		Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
Intelligence A Levels Extraversion Neuroticism Locus of control Academic S.C. Anxiety Motivation Time Examinations	2. Degree course M	M.H.V.R.Test G.C.E. E.P.I. E.P.I. Rotter's I.E. Brookover's A.S.C Univ. London Qu. Univ. London Qu. Time Log Exam results	r	SH 1 and Anxiety Motivn. Acad.SC.		Rejected
				SH 2 and Motivn.		Rejected
				SH 3 and Motivn. Acad.SC.		Rejected
				SH 4 and Anxiety Motivn.		Rejected
				SH 5 and Neurot. Anxiety Motivn. Acad.SC.		Rejected
				SH 6 and Motivn. Time Acad.SC.		Rejected
				SH 7 and Motivn.		Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
Intelligence A Levels Extraversion Neuroticism Locus of control Academic S.C. Anxiety Motivation Time Examinations	3. Degree course F	M.H.V.R. Test G.C.E. E.P.I. E.P.I. Rotter's I.E. Brookover's A.S.C Univ. London Qu. Univ. London Qu. Time Log Exam results	r	SH I and -		
				SH 2 and Intell. Motivn.		Rejected
				SH 3 and Intell. Neurot. Acad.SC.		Rejected
				SH 4 and Extrav. Anxiety Motivn.		Rejected
				SH 5 and Extrav. Anxiety Motivn. Acad.SC		Rejected
				SH 6 and Extrav. Motivn. Time		Rejected
				SH 7 and Intell. Motivn.		Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS DIRECTION	EVALUATION
Intelligence A Levels Extraversion Neuroticism Locus of control Academic s.C. Anxiety Motivation Time Examinations	4. Non degree course	M.H.V.R. Test G.C.E. E.P.I. E.P.I. Rotter's I.E. Brookover's A.S.C Univ. London Qu. Univ. London Qu. Time Log Exam results	r	SH I and Time	Rejected
				SH 2 and -	Accepted
				SH 3 and Locus of C A Levels Motivn. Time Acad.SC	Rejected
				SH 4 and Acad.SC.	Rejected
				SH 5 and Intell. Locus of C Motivn. Time	Rejected
				SH 6 and Motivn. Time Acad,SC.	Rejected
				SH 7 and Neurot. Locus of C	Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
Intelligence	5. Non degree M	M.H.V.R. Test	r	SH 1 and Intell.		Rejected
A Levels		G.C.E.		SH 2 and -		Accepted
Extraversion		E.P.I.		SH 3 and Time Acad.SC		Rejected
Neuroticism		E.P.I.		SH 4 and -		Accepted
Locus of Control		Rotter's I.E.		SH 5 and Time		Rejected
Anxiety		Univ. London Qu.		SH 6 and Intell. Motivn. Time		Rejected
Motivation		Univ. London Qu.		SH 7 and -		Accepted
Academic S.C.		Brookover's A.S.C.				
Time		Time Log				
Examinations		Exam results				
Intelligence	IO. Non degree F	M.H.V.R. Test		SH I and -		Accepted
A Levels		G.C.E.		SH 2 and -		Accepted
Extraversion		E.P.I.		SH 3 and -		Accepted
Neuroticism		E.P.I.				
Locus of control		Rotter's I.E.				
Academic S.C.		Brookover's A.S.C.				

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
Anxiety Motivation Time Examinations		Univ. London Qu. Univ. London Qu. Time Log Exam results	r	SH 4 and Acad.SC.		Rejected
				SH 5 and Motivn.		Rejected
				SH 6 and Motivn. Time		Rejected
				SH 7 and Motivn.		Rejected
II. No sig. relationship exists between the SEPARATE STUDY HABITS and EXAMINATION performance	I. Total	Exam results	r	Sig.		Rejected
	2. Degree course			Sig.		Rejected
	3. Non degree course			N.Sig.		Accepted
	4. Degree course M	SH I		N.Sig.		Accepted
		SH 2		Sig.		Rejected
		SH 3		Sig.		Rejected
		SH 4		N.Sig.		Accepted
		SH 5		Sig.		Rejected
		SH 6		Sig.		Rejected
		SH 7		Sig.		Rejected
	5. Degree course F	SH I		Sig.		Rejected
		SH 2		Sig.		Rejected
		SH 3		Sig.		Rejected
		SH 4		Sig.		Rejected
		SH 5		Sig.		Rejected
		SH 6		N.Sig.		Accepted
		SH 7		N.Sig.		Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS DIRECTION	EVALUATION
No sig. correlations obtain for	6. Non degree course	SHEIK	r	N.Sig.	Accepted
	7. Non degree M	SH I		N.Sig.	Accepted
		SH 2		Sig.	Rejected
		SH 3		Sig.	Rejected
		SH 4		N.Sig.	Accepted
		SH 5		Sig.	Rejected
		SH 6		Sig.	Rejected
		SH 7		N.Sig.	Accepted
	8. Non degree F	SH I		Sig.	Rejected
		SH 2		Sig.	Rejected
		SH 3		Sig.	Rejected
		SH 4		Sig.	Rejected
		SH 5		Sig.	Rejected
		SH 6		Sig.	Rejected
		SH 7		N.Sig.	Accepted
	9. Fac I Males	SH I		N.Sig.	Accepted
		SH 2		N.Sig.	Accepted
		SH 3		N.Sig.	Accepted
		SH 4		N.Sig.	Accepted
		SH 5		N.Sig.	Accepted
		SH 6		N.Sig.	Accepted
		SH 7		Sig.	Rejected
	IO. Fac I Females	SH I		Sig.	Rejected
		SH 2		N.Sig.	Accepted
		SH 3		N.Sig.	Accepted
		SH 4		N.Sig.	Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
		SH 5	r	N.Sig.		Accepted
		SH 6		N.Sig.		Accepted
		SH 7		N.Sig.		Accepted
	II. Fac I Total	SH I		N.Sig.		Accepted
		SH 2		N.Sig.		Accepted
		SH 3		N.Sig.		Accepted
		SH 4		N.Sig.		Accepted
		SH 5		N.Sig.		Accepted
		SH 6		N.Sig.		Accepted
		SH 7		Sig.		Rejected
	I2. Fac 2 Males	SH I		N.Sig.		Accepted
		SH 2		N.Sig.		Accepted
		SH 3		N.Sig.		Accepted
		SH 4		Sig.		Rejected
		SH 5		N.Sig.		Accepted
		SH 6		N.Sig.		Accepted
		SH 7		N.Sig.		Accepted
	I3. Fac 2 Females	SH I		N.Sig.		Accepted
		SH 2		N.Sig.		Accepted
		SH 3		N.Sig.		Accepted
		SH 4		Sig.		Rejected
		SH 5		Sig.		Rejected
		SH 6		N.Sig.		Accepted
		SH 7		N.Sig.		Accepted
	I4. Fac 2 Total	SH I		N.Sig.		Accepted
		SH 2		N.Sig.		Accepted
		SH 3		N.Sig.		Accepted
		SH 4		N.Sig.		Accepted

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
		SH 5	r	N.Sig.		Accepted
		SH 6		N.Sig.		Accepted
		SH 7		N.Sig.		Accepted
	I5. Fac 3 Males	SH I		Sig.		Rejected
		SH 2		Sig.		Rejected
		SH 3		N.Sig.		Accepted
		SH 4		N.Sig.		Accepted
		SH 5		Sig.		Rejected
		SH 6		Sig.		Rejected
		SH 7		Sig.		Rejected
	I6. Fac 3 Females	SH I		Sig.		Rejected
		SH 2		Sig.		Rejected
		SH 3		Sig.		Rejected
		SH 4		N.Sig.		Accepted
		SH 5		Sig.		Rejected
		SH 6		Sig.		Rejected
		SH 7		N.Sig.		Accepted
	I7. Fac 3 Total	SH I		Sig.		Rejected
		SH 2		Sig.		Rejected
		SH 3		Sig.		Rejected
		SH 4		Sig.		Rejected
		SH 5		Sig.		Rejected
		SH 6		Sig.		Rejected
		SH 7		Sig.		Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
I2. No sig. differ. in frequencies of correlations between LEVEL of exam perf. and STUDY HABITS occur in various groups	I. Faculties	SHEIK & Exams	X^2	Sig.	Fac I least f Fac 3 most f	Rejected
	2. Total 3. Degree courses, T. 4. Degree M and Degree F 5. Non degree courses 6. Non degree M and F 7. Non degree, T.			Sig.	Males have most fail & lowest results. Males have most max. results	Rejected
	8. Degree courses (Total, M & F) grouped according to being above and below the combined study habits Mean			Sig.	Above $\bar{M}$	Rejected
	9. Non degree (as above)			N.Sig.	-	Accepted
No saturation loading of common factors occurs in the study habits		SH I and SH 2	r	Sig.	Factors common to other skill	Rejected

HYPOTHESIS	GROUP	TEST MATERIALS	STAT. PROC.	RESULTS	DIRECTION	EVALUATION
I3. No sig. differ. in STUDY HABITS and the variables listed exist for students when classified as FOCUSERS and SCANNERS	I. Focusers v Scanners	Concept Matrix &	X^2			
Study habits		SHEIK		N.Sig.	-	Accepted
Neuroticism		E.P.I.		Sig.	Scanners +	Rejected
Academic S.C.		Brookover's ASC		Sig.	Focusers -	Rejected
Extraversion		E.P.I.		N.Sig.	-	Accepted
Intelligence		M.H.V.R. Test		N.Sig.	-	Accepted
A Levels		G.C.E.		N.Sig.	-	Accepted

5.8 Discussion of Results

"If you want to make sense, I have learned, you should never use the word 'should' or 'ought' until after you have used the word 'if'."

(Barth, The Floating Opera)

In retrospect, it seems to be the case that all previous studies investigating students' study behaviours and learning processes, can be classified as being one of two types.

The distinguishing attribute of the first type of research investigation is that it is generated from theories of cognition within general psychology (Ausubel, 1969; Bruner, 1956; Posner, 1978).

The distinguishing attribute of the second type of research investigation is that it is generated from *in situ* observations made of the relationships existing between academic achievement and aspects of the learning context (Haertel, 1983; Svensson, 1979; Laurillard, 1979).

Bennett et al (1984) in a brief and critical statement on the usefulness of research concerning student learning indirectly refers to traditions within the Literature when he suggests that nothing of great value for practical application to learning and teaching interactions has been generated from any type of research investigation.

An objective of the present Study's discussion on *"implications for future research"* is to evaluate this proposition and to extent the evaluation to the findings of the present Study. Prior to this the assumption that research *ought* to generate practical implications is examined explicitly.

A consideration of whether research *ought* generate practical implications.

An adage familiar to many postgraduates engaged in professional training courses like the P.G.C.E. is that practice is theory applied. The intention is that implementation of skills, as in teaching, is the direct translation of psychological theories from scientific research. A consequence of this intention is that two implicit assumptions about the status of research results can be held.

The first assumption is that knowledge can be held to be a prerogative of science which, through application of its rigorous method, classifies information into theories capable of generalisation into laws. Psychology, in claiming a scientific status, is seen as being concerned with the discovery of truth which generates theories capable of generalisation into laws governing learning behaviours.

A qualification that psychology must, according to common sense, adopt is that exceptions to scientific laws be allowed without disproof. This is a common sense constraint on the precision of psychology as a science because exceptions to the rule do exist.

eg. *Within the natural sciences exceptions cannot be accommodated so that in physics a dropped object from a height that does not fall disproves the law of gravity. In psychology a learner who is not motivated by incentives does not disprove laws of reinforcement.*

It can be held that scientists' discoveries are themselves the intrinsic justification of research enterprise. The adage of knowledge for knowledge's sake intends a legitimisation of research in terms of its generation of further research. It is a view of science advocated by Popper (I956) and is popularly held today.

eg. *Within psychology there are Piaget's (I920) genetic epistemology, Ausubel's (I968) meaningful learning and Bruner's (I956) notion of thinking styles to serve as examples of this view. These scientists aim at discovering knowledge and others apply the theories to practical problems in education.*

A second assumption of the adage of practice being theory applied, is that practice is seen as analogous to engineering in its conceptual status and that it ought similarly to observe a handbook on regulations governing practice.

eg. *In the natural sciences applied disciplines like engineering observe manuals on construction principles generated from physics research into concepts of 'stress' and 'mass'. Similarly, advice on teaching and learning from cognitive concepts of learning can be perceived as constituting an engineering-like activity.*

A consequence of this is that research employs one context for its investigations and another for its applications. This can be perceived as invalid because results are extrapolated to contexts sometimes distinct in kind from that of the original research situation.

Another perception of this concerns the accountability of

Theorists when *disasters* occur in practice (Davidson, 1977). The intention here is to distinguish between the situation of professional consultancy in engineering and rationales for practice within psychology.

eg. A geologist, as a professional consultant, would be held culpable in an omission to detect a geological fault where an engineer builds a bridge. Psychologists are not held responsible when extrapolations into pedagogy lead to disaster.

The difference is arguably that culpability rests on the professionalism of the consultant in the engineering analogy. However, it is arguable that the non consultancy status of research psychologists carries an ethical responsibility. In other words, scientists *ought* to be responsible for the realisation of their research into consequences for practice.

Alternatively, it could be denied that knowledge is a prerogative of science. The implication of this is that research can be perceived as pragmatic in its concern for finding solutions to problems in the context in which they occur. This type of research approach is not aimed at generating theories capable of generalisation into laws but is instead something of a *trouble shooter* in its aim of generating answers.

In considering these two types of approach it could be suggested that overlap exists. In other words, even the former type has some concern with the realisation of practical ends and that evidence of this exists in the fact of funding decision making processes and the subsequent accountability to research councils, government or sponsorship that relates to results.

A conceptual difference,however, is proposed to exist and this difference is identified in the procedures of research design.

Research into students' learning processes and study behaviours is suggested by the present Study to be most appropriately pursued in investigation aimed at describing and measuring behaviours scientifically. However, the description has a prescriptive function in that results suggest implications for practice. The generalisation of these results is more constrained than the latter type of research discussed above allows.

Brofenbrenner (I976); Doyle (I979) suggest that learning processes are too complex for generalisations to be made from one context to another.Presumably they are referring to the dynamic nature of teaching and learning interactions that defines each situation as unique. Doyle (I979) describes learning as a subtle, covert, intellectual activity that occurs in a socially complex environment. He sees this as making descriptions of learning processes possible only in diffuse and inexact terms (Doyle, I980).

The present Study has examined learning approaches and study behaviours of students in the context of a polytechnic. The extent to which the findings can be generalised to other contexts is necessarily limited by the Brofenbrenner analysis to contexts which are similar in kind.

It seems reasonable to propose that students learn to respond to learning and studying requirements in identifiable and measurable ways which brings some stability and predictability to behaviours within higher education.

On this premise, the study of a particular group of students *(polytechnic)* from a selected focus *(study habits and thinking styles)* has some generalisation to other, similar, contexts. The description has explanatory and predictive functions and is intended to form a basis for suggestions for practice as well as for further research.

5.8.I Intelligence

(a) Differences between males and females

Reference to Table I shows that for intelligence the females are significantly superior to the males in the total sample of students. Examination of Table 2 shows, however, that for degree course students there is no significant difference in intelligence between the sexes but in the non degree course student group, the females are significantly superior to the males.

Consideration of Table 3 shows that within Faculty I and Faculty 2 the females are significantly superior to the males for intelligence but that within Faculty 3 no such significant sex difference occurs. Inspection of Table 5 shows that within Faculty I and Faculty 2 female degree course students are significantly superior to male degree students for intelligence but no significant sex difference for intelligence occurs between degree course females and degree course males in Faculty 3. Reference to Table 5 shows no significant sex difference between non degree course females and non degree course males in Faculty I, Faculty 2 and Faculty 3.

The null hypothesis that no significant difference exists for intelligence between female and male students in the total sample is rejected (Table I). The null hypothesis that no significant sex difference for intelligence exists between (a) degree course females and males, and (b) non degree course females and males is accepted for the degree course students but rejected for the non degree course students (Table 2). The null hypothesis that within faculties no significant sex difference for intelligence exists between students is rejected for students in Faculty I and Faculty 2 but is accepted for students in Faculty 3 (Table 3). The null hypothesis that no significant sex difference for intelligence exists between degree course students within each faculty is rejected for students in Faculty I and Faculty 2 but is accepted for students in Faculty 3.

Finally, the null hypothesis that no significant sex difference for intelligence exists between non degree course students within each faculty is accepted for students in all three faculties.

(b) Differences between faculty membership

Reference to Tables 6and 7 shows that for the total sample of students Faculty I and Faculty 2 students are significantly superior in intelligence to Faculty 3 students. The mean difference for intelligence between Faculty I and Faculty 2 students is not statistically significant.

Consideration of Tables 8,9,I0 and II shows that mean faculty differences for intelligence for (a) males (Tables 8 and 9) and for (b) females (Tables I0 and II), irrespective of course pursued, are not statistically significant.

Inspection of Tables I2, I3, I4, I5, I6, I7, I8 and I9 shows that mean faculty differences for intelligence are statistically significant for (a) Faculty I degree course males versus Faculty 2 and Faculty 3 degree course males with Faculty I degree course males being significantly superior for intelligence (Tables I2 and I3), (b) Faculty I degree course females versus Faculty 2 and Faculty 3 degree course females with Faculty I degree course females being significantly superior for intelligence (Tables I4 and I5), (c) Faculty 2 non degree course males versus Faculty I and Faculty 3 non degree course males with Faculty 2 non degree course males being significantly superior (Tables I6 and I7), (d) Faculty 2 non degree course females versus Faculty 3 non degree course females with the former being significantly superior for intelligence (Tables I8 and I9).

The mean faculty difference between Faculty 2 and Faculty 3 degree course females and Faculty I and Faculty 3 non degree course females is not statistically significant for intelligence. The mean faculty difference for intelligence between students comprising both sexes and pursuing degree courses are significant for Faculty I versus Faculty 2 and Faculty 3, the former students being significantly superior for intelligence (Tables 20 and 2I).

There is no significant mean difference between degree students in Faculty 2 and Faculty 3 (Tables 20 and 2I). In the case of students comprising both sexes and pursuing non degree courses, Faculty 2 students are significantly superior for intelligence to Faculty I and Faculty 2 students, while Faculty I students are also superior to Faculty 3 students.

The null hypothesis that no significant mean difference in intelligence exists between different groups of faculty membership in the total sample is rejected for Faculty I and Faculty 3 students and for Faculty 2 and Faculty 3 students but it is accepted for Faculty I and Faculty 3 students.

The null hypothesis that no significant mean difference for intelligence exists between (a) males in different faculties, irrespective of course pursued, and (b) females in different faculties irrespective of course pursued, is accepted.

The null hypothesis that no significant mean difference in intelligence exists between students of different faculties classified according to sex and type of course pursued is rejected for (a) Faculty I degree course males and females, (b) Faculty 2 non degree course males versus Faculty I and Faculty 3 non degree course males, (c) Faculty 2 non degree course females versus Faculty 3 non degree course females.

The null hypothesis is accepted for (a) Faculty 2 and Faculty 3 degree course females and males, (b) Faculty I and Faculty 3 non degree course females and males, (c) Faculty I and Faculty 2 non degree course females.

The null hypothesis that no significant mean difference for intelligence exists between (a) degree course students in different faculties, (b) non degree course students in different faculties, is rejected for Faculty I degree course students; Faculty I non degree course students versus Faculty 2 and Faculty 3 non degree course students; Faculty 2 non degree course students versus Faculty 3 non degree course students. The null hypothesis is accepted only for Faculty 2 versus Faculty 3 degree course students.

(c) Differences between degree course and non degree courses

Reference to Table 23 shows that for the total sample of students degree course students are significantly superior for intelligence to non degree course students.

Inspection of Table 24 shows a significant mean difference for intelligence between degree course and non degree course students within all faculties, the degree course students being significantly superior.

Examination of Table 25 shows a significant mean difference for intelligence between male degree course and male non degree course students within the faculties. In all the faculties the degree course students are significantly superior.

Consideration of Table 26 shows no significant mean difference for intelligence between degree course females and non degree course females within Faculty 2 and Faculty 3. However, there is a significant mean difference for intelligence between degree course females and non degree course females in Faculty I, the degree course females being significantly superior.

The null hypothesis that no significant mean difference for intelligence exists between degree course and non degree course students is rejected for the total sample of students.

The null hypothesis that no significant mean difference for intelligence exists between degree course and non degree course students within the faculties is rejected.

The null hypothesis that no significant mean difference for intelligence exists for (a) male degree course and male non degree course students within faculties, and for (b) female degree course and female non degree course students is rejected for the males and the females in Faculty I. However, for the females in Faculty 2 and Faculty 3, it is accepted.

Discussion

There is no obvious explanation to account for these results except to observe that in the case of the superior intelligence of non degree course females versus the non degree course males, the number of females is small, being only 45. This might be the outcome of a selective entrance policy or of a self selecting mechanism on the part of the female students. Whichever the more likely account it seems reasonable to assume that the female students are a more homogeneous group than the males.

A parallel might exist in the case of the superior intelligence for Faculty I and Faculty 2 females over males. These faculties are comprised of engineering and mathematics and computing courses which predictably have a more selective female population and which is outnumbered by the male population with a wider ability range.

Reasons for the differences observed for the sexes between faculties are debatable. There is support in the Literature (Derfflinger, I943) for differences in measured ability between faculty members to be the result of poor sampling and unsuitable test norms. Dale (I954) confirms the belief that choice of test is critical in the interpretation of scores and suggests that verbal and non verbal test content produces different results when used with Arts and Science students.

In the present Study all students were asked to comment on the test content and all reported a high face validity for the instrument. The manual suggests a statistical validity for its use with students of different backgrounds.

Faculty I students generally are superior to Faculty 2 and Faculty 3 students which might suggest a more selective admissions procedure except that differences in A level points between the faculties do not support the suggestion. There is no immediate explanation to account for the difference in measured intelligence as there is in the case of the degree course versus the non degree course students where differences in A level points are supportive of the ability distinction.

5.8.2 Extraversion

(a) Differences between males and females

Examination of Table I shows no significant difference for extraversion between the sexes for the total sample of students and consideration of Table 2 shows no significant sex differences between degree course and non degree course students.

Reference to Table 3 shows that within each faculty the mean sex difference for extraversion is not statistically significant, as is the case for degree course students within all faculties (Table 4). However, as regards non degree course students, one significant sex difference for extraversion occurs, namely, for students in Faculty 3. It will be observed that the males are significantly more extravert than the females but the result needs caution in its interpretation because of the small number of female non degree students (Table 5).

Inspection of Table 5 shows that in the case of non degree course students in Faculty I and Faculty 2 no significant mean sex difference for extraversion occurs.

The null hypothesis that no significant difference for extraversion exists between female and male students is accepted for the total sample (Table I), for the degree course and non degree course students respectively (Table 2), for students within each faculty, for degree course students within each faculty, and for non degree course students within each faculty, and for non degree course students within Faculty I and Faculty 2.

However, the null hypothesis that no significant difference in extraversion exists between female and male students is rejected for students within Faculty 3.

(b) Differences between faculty membership

Examination of Tables 6 and 7 shows that for the total sample of students there is a significant mean difference for extraversion between Faculty I and Faculty 3 students, the latter being significantly more extravert. However, mean differences for extraversion between (a) Faculty I and Faculty 3 students, and (b) Faculty 2 and Faculty 3 students are not statistically significant.

Reference to Tables 8 and 9 shows that extraversion differences between

Faculty I males and Faculty 3 males; Faculty 2 and Faculty 3 males are not statistically significant. However, the mean difference for extraversion between Faculty I males and Faculty 3 males is statistically significant, the latter being more extravert.

Consideration of Tables I0 and II shows that mean differences for extraversion between females belonging to different faculties are not statistically significant.

Faculty mean differences for extraversion for degree course males belonging to different faculties apart from Faculty I and Faculty 2 and degree course females belonging to different faculties, are not statistically significant (Tables I2, I3, I4, I5). Faculty 2 males are significantly more extravert.

Inspection of Tables I6 and I7 shows that mean differences for extraversion between non degree course males belonging to different faculties are not statistically significant for the non degree course males in Faculty I and Faculty 2 and in Faculty 2 and Faculty 3, but there is a significant difference between non degree course males belonging to Faculty I and Faculty 3, the latter being more extravert.

Examination of Tables I8 and I9 shows no significant mean difference between non degree course females in Faculty I and Faculty 2 ; Faculty I and Faculty 3, but there is a significant difference for extraversion between non degree course females in Faculty 2 and

Faculty 3, the former being significantly more extravert

Reference to Tables 20 and 2I shows that mean differences between degree course students of different faculties are not significant for Faculty I and Faculty 3 degree course students and Faculty 2 and Faculty 3 degree course students but there is a significant mean difference between Faculty I and Faculty 2 degree course students, the latter being significantly more extravert.

The null hypothesis that no significant mean difference for extraversion exists between different groups of faculty students in the total sample is rejected for Faculty I and Faculty 2 students, but accepted for Faculty I and Faculty 3 students and Faculty 2 and Faculty 3 students.

The null hypothesis that no significant mean difference for extraversion exists between (a) males belonging to different faculties, irrespective of course pursued, and (b) females belonging to different faculties, irrespective of course pursued, is accepted for males in Faculty I and Faculty 3, and Faculty 2 and Faculty 3, and also for the females in all faculties. The null hypothesis is rejected for males in Faculty I and Faculty 2.

The null hypothesis that no significant mean difference for extraversion exists between students of different faculties classified according to sex and type of course pursued is accepted for (a) degree course females belonging to different faculties, and for degree course males apart from those in Faculties I and 2, (b) non degree course males belonging to Faculties I and 2 and Faculties 2 and 3, and also for non degree course females belonging to Faculties I and 3 and Faculties 2 and 3. However, for non degree course males belonging to Faculties I and 3, and also for non degree course females belonging to Faculties 2 and 3, the above null hypothesis is rejected.

The null hypothesis that no significant mean difference for extraversion exists between (a) degree course students belonging to different faculties, and (b) non degree course students belonging to different faculties, is rejected for Faculty I and Faculty 2 degree course students and for Faculty I and Faculty 3 non degree course students.

However, the above null hypothesis is accepted for Faculty I and Faculty 3 degree course students, Faculty 2 and Faculty 3 degree course students, Faculty I and Faculty 2 non degree course students, and Faculty 2 and Faculty 3 non degree course students.

(c) Differences between degree course and non degree courses

Reference to Table 23 shows that no significant mean difference for extraversion between degree course and non degree course students in Faculties I and 2 exist but that a significant mean difference between degree course and non degree course students in Faculty 3 does, the non degree course students being significantly more extravert.

Examination of Table 25 shows no significant mean difference for extraversion between degree course and non degree course students within Faculties I and 2 but there is a significant mean difference between degree course and non degree course students within Faculty 3, the non degree course students being significantly more extravert.

Inspection of Table 26 shows no significant mean difference for extraversion between degree course and non degree course students within Faculties I and 2 but there is a significant mean difference for extraversion between degree course and non degree course students within Faculty 3, the degree course students being significantly more extravert. This needs to be treated with caution since the number of non degree course students in Faculty 3 is small.

The null hypothesis that no significant mean difference for extraversion exists between degree course and non degree course students is rejected for the total sample of students.

The null hypothesis that no significant mean difference for extraversion exists between degree course and non degree course students within the faculties is accepted for students within Faculties I and 2 but is rejected for students within Faculty 3.

The null hypothesis that no significant mean difference for extraversion exists for (a) male degree course and male non degree course students within the faculties, and (b) female degree course and female non degree course students within the faculties, is accepted for males in Faculties I and 2; females in Faculties I and 2, The above null hypothesis is rejected for males in Faculty 3 and for females in Faculty 3.

Discussion.

The results do not generally support the Literature which tends to indicate that low extraversion is more compatible with academic achievement (Furneaux, I962; Kelvin, I965; Lavin, I965; Eysenck and Cookson, I969).Although the type of course pursued cannot serve as an index of achievement prior to admission as an undergraduate, it might have been anticipated that degree course students would show a trend towards lower extraversion in comparison with non degree course students.

However, it must be noted that some studies in the Literature have found that no positive significant relationship exists between extraversion and achievement levels (Gibbons and Savage, I965; Entwistle and Wilson, I977).

The results do not support the findings of Warburton (I968) which state that degrees of extraversion vary in sub groups of students classified according to type of subjects being studied. Entwistle (I97I) and Entwistle and Wilson (I977) confirmed Warburton's results with the observation that introversion tends to be associated with engineering type courses within science faculties. However, the one significant, positive difference found by the present Study between non degree course females and non degree course males in Faculty 3 (predominantly mathematics and computer science subjects) does not support the Literature. A result which does lend some support to the Literature is the observation that Faculty I students generally are more extravert than students in the science faculty (Faculty 3) and students in the professional studies faculty (Faculty 2).

5.8.3 Neuroticism

(a) Differences between males and females

Reference to Table I shows that for the total sample the females are significantly more neurotic than the males. This significant female superiority holds also for the degree course students but not for the non degree course students (Table 2).

Consideration of Tables 3, 4, and 5 shows no significant mean sex differences for (a) students in general within the faculties, (b) students pursuing degree courses, and, (c) students pursuing non degree courses within faculties.

The null hypothesis that no significant mean difference for neuroticism exists for male and female students in the total sample is rejected (Table I). The null hypothesis that no significant mean difference for neuroticism exists between (a) degree course females and degree course males, and, (b) non degree course females and non degree course males, is rejected for the degree course students but is accepted for the non degree course students (Table 2).

The null hypothesis that no significant sex difference for neuroticism exists between (a) students in general within each faculty, (b) students pursuing degree courses within each faculty, (c) students pursuing non degree courses within each faculty, is accepted.

(b) Differences between faculty membership

Reference to Tables 6 and 7 shows that for the total sample of students there are significant mean differences for neuroticism between (a) Faculty I and Faculty 2 students, the latter being significantly more neurotic, and, (b) Faculty 2 and Faculty 3 students, the former being significantly more neurotic. However, the mean difference for neuroticism is not significant for Faculty I and Faculty 3 students.

Inspection of Tables 8, 9, IO and II shows that, irrespective of sex and type of course pursued, mean differences for neuroticism between (a) males belonging to different faculties, and, (b) females belonging to different faculties, are not statistically significant.

Examination of Tables I2, I3, I4, I5, I6, I7, I8 and I9 shows that there is no significant mean difference for (a) degree course students classified according to sex, and, (b) non degree course students classified according to sex.

Consideration of Tables 20 and 2I shows significant mean differences for neuroticism between degree course students belonging to (a) Faculties 2 and 3, the former being significantly more neurotic, and, (b) Faculties I and 2, the latter being significantly more neurotic. The mean difference for neuroticism between degree course students belonging to Faculties I and 3 is not significant.

Inspection of Tables 20 and 2I shows no significant mean differences for neuroticism between non degree course students belonging to different faculties. The null hypothesis that no significant mean difference for neuroticism exists between different groups of faculty students in the total sample is rejected for Faculty I and Faculty 2 students and for Faculty 2 and Faculty3 students, but it is accepted for Faculty I and Faculty 3 students.

The null hypohtesis that no significant mean difference for neuroticism exists between students of different faculties classified according to sex and type of course pursued is accepted.

The null hypothesis that no significant mean difference for neuroticism exists between (a) degree course students belonging to different faculties, and, (b) non degree course students belonging to different faculties, is accepted for Faculty I and Faculty 3 students and for all non degree course students. The null hypothesis is rejected for Faculty 2 and Faculty 3 students pursuing degree courses.

(c) Differences between degree course and non degree courses

Reference to Table 23 shows that in the total sample of students no significant mean difference for neuroticism exists between degree and non degree course students.

Examination of Tables 24, 25 and 26 shows that no significant mean difference for neuroticism exists for (a) degree course and non degree course students within each faculty, and, (b) male degree course and male non degree course students within each faculty, and, (c) female degree course and female non degree course students within each faculty.

The null hypothesis that no significant mean difference for neuroticism exists for (a) degree course and non degree course students in the total sample, and, (b) degree course and non degree course students within each faculty, and, (c) male degree course and male non degree course students within each faculty, and, (d) female degree course and female non degree course students within each faculty, is rejected.

Discussion

There is evidence in the Literature (Bendig, 1960; Thomas, 1980) of a tendency towards higher neuroticism in female students as opposed to male students. The present Study's findings that higher neuroticism scores for females in general, and for degree course females, supports the earlier research results.

There is some evidence in the Literature (Entwistle, 1983; Brown, 1970; Furneaux, 1962) for a relationship between neuroticism and learning to occur in an inverted "U" shape curve. The implication of this is that too high a level of anxiety as well as too little inhibits learning performance.

It is of interest to note that females constitute a smaller group numerically in the present Study and so the distribution of neuroticism scores can be expected to be smaller than for the males who will have more scores around the average. A possibility is that female students are a more homogeneous population, with higher neuroticism scores than the male. It might be the case that this reflects a self selected trend with more anxious, neurotic females gaining admittance onto courses.

A study by Entwistle and Welsh (1969) established that no sex difference for neuroticism exists in their undergraduate student sample. The conclusion of their study is that differences for neuroticism exist within sub groups of male and female students classified according to achievement level rather than according to sex. The present Study offers no confirmation of the finding.

A study by Entwistle (I97I) suggests that neuroticism is typically higher in groups of students classified according to type of subject being followed rather than classified according to sex or type of course pursued, described as degree course or non degree course. This suggests that differences between faculty membership could be anticipated for neuroticism levels but the present Study offers no confirmation of this proposition.

5.8.4 Locus of Control

(a) Differences between males and females

Inspection of Tables I, 2, 3, 4 and 5 shows no significant mean sex differences for locus of control in the various groups of students, apart from the significant sex difference for degree course students shown in Table 2. Consideration of Table 2 shows that the female degree course students are significantly superior to the males for locus of control.

The null hypothesis that no significant difference for locus of control exists between the sexes for (a) the total sample, and, (b) within faculties, and, (c) students pursuing non degree courses, is accepted. It is rejected for degree course students (Table 2).

(b) Differences between faculty membership

Reference to Tables 6 and 7 shows that for the total sample of students there are significant mean differences for locus of control between (a) Faculty I and 2 students, the latter being significantly superior, and, (b) Faculty 2 and 3 students, the former being significantly superior.

However, the mean difference for locus of control between Faculty I and Faculty 3 students is not statistically significant.

Inspection of Tables 8, 9, I0 and II shows that, irrespective of sex and type of course pursued, mean differences for locus of control between (a) males belonging to different faculties, and, (b) females belonging to different faculties, are not significant.

Examination of Tables I2, I3, I4, I5, I6, I7, I8 and I9 shows no significant mean differences for locus of control between (a) degree course students, and, (b) non degree course males belonging to Faculties I and 3, and, (c) non degree course females belonging to Faculties I and 3 and Faculties 2 and 3.

However, there are significant mean differences for locus of control (a) non degree course males belonging to Faculties I and 2, the latter being significantly superior, and, (b) non degree course males in Faculties 2 and 3, the former being significantly superior, and, (c) non degree course females belonging to Faculties I and 2, the latter being significantly superior (Tables I6, I7, I8, I9).

Consideration of Tables 20 and 2I shows no significant mean difference for locus of control between degree course students belonging to different faculties. Neither is there any significant mean difference between non degree course students belonging to Faculties I and 3 (Tables 20 and 22).

However, inspection of Tables 20 and 22 shows significant mean differences for locus of control between non degree course students beloning to (a) Faculties I and 2, the latter being significantly superior, and, (b) Faculties 2 and 3, the latter being superior.

The null hypothesis that no significant mean difference for locus of control exists between different groups of faculty students in the total sample is rejected for Faculties I and 2 students and also for Faculties 2 and 3 students, but it is accepted for Faculties I and 3 students.

The null hypothesis that no significant mean difference for locus of control exists between (a) males belonging to different faculties, and, (b) females belonging to different faculties, is accepted.

The null hypothesis that no significant mean difference for locus of control exists between students of different faculties classified according to sex and type of course pursued, is accepted for (a) degree course males in Faculties I and 3, and, (b) non degree course males in Faculties 2 and 3, and, (c) non degree course females in Faculties I and 3 and Faculties 2 and 3.

The above hypothesis is rejected for (a) non degree course males in Faculties I and 2, and, (b) non degree course males in Faculties 2 and 3 (c) non degree course females in Faculties I and 2.

The null hypothesis that no significant mean differences exist for loc''s of control between (a) degree course students belonging to different faculties, and, (b) non degree course stduents belonging to different faculties, is accepted for all degree course students and for non degree course students in Faculties I and 3. The above hypothesis is rejected for Faculties I and 2 non degree course students and also for Faculties 2 and 3 non degree course students.

(c) Differences between degree course and non degree courses

Reference to Table 23 shows that for the total sample of students there is no significant mean difference for locus of control between degree course and non degree course students.

Examination of Table 24 shows no significant mean difference for locus of control between degree course and non degree course students within each faculty exists.

Inspection of Table 25 shows that no significant mean difference for locus of control exists between male degree course and male non degree course students within Faculties I and 3 but that a significant mean difference does exist between degree course and non degree course males in Faculty 2, the latter being significantly superior.

Consideration of Table 26 shows no significant mean difference for locus of control exists between female degree course and female non degree course students within each faculty.

The null hypothesis that no significant mean difference for locus of control exists between degree course and non degree course students, is accepted for the total sample of students, as is the null hypothesis that no significant mean difference exists between degree course and non degree course students within each faculty.

The null hypothesis that no significant mean difference for locus of control exists for (a) male degree course and male non degree course students within each faculty, and, (b) female degree course and female non degree course students within each faculty, is accepted for males in Faculties I and 3 and for females in all faculties. The above hypothesis is rejected for male degree course and male non degree course students in Faculty 2.

Discussion

There is nothing in the Literature concerning the variability between groups of students classified in various ways of internal and external locus of control and the present Study has some originality in its results for this variable.

It is of interest to note that degree course females have higher externality than other degree course students and non degree course students. The reasons for this are not clear but a suggestion is that these students show a patterning of personality traits in that the high externality is parallel with high neuroticism. Anxiety can be perceived as conducive towards an expectancy of being powerless to produce changes in the learning environment and in behaviour within it. Rotter (I954) has found some evidence of an association between high anxiety, neuroticism and externality and this patterning of characteristics would be a useful focus for further investigation.

It is observed that Faculty 2 students generally tend to have lower externalisation than students in Faculties I and 3 and although no obvious explanation exists to account for this it is appropriate to remember that Faculty 2 contrasts with the engineering and science type subjects within Faculties I and 3. Courses within Faculty 2 are humanities and business studies type subject fields with fewer time tabled lecture and laboratory hours. The consequence is that more time is available for individual studying and an intention of this is the greater expectation placed on independent work. A possible outcome of this suggests itself to be that students within Faculty 2 hold themselves more responsible for their academic achievement.

5.8.5 A Levels

(a) Differences between males and females

Examination of Table I shows that in the total sample of students the females are significantly superior to the males for A level point. This superiority does not hold for the smaller sub groups of males and females classified according to type of course pursued and faculty membership.

Inspection of Table 2 shows that for degree course and non degree course students respectively, no significant mean difference between the sexes occur. This is also the case for males and females within each faculty (Table 3) and for the sexes within each faculty classified according to type of course pursued (Tables 4 and 5).

The null hypothesis that no significant difference in A level points exists between the sexes is rejected for the total sample of students but it is accepted for (a) degree course and non degree course students respectively, and, (b) females and males within each faculty, and, (c) female and male degree course students, and, (d) female and male non degree course students.

(b) Differences between faculty membership

Reference to Tables 6 and 7 shows that for the total sample of students there are no significant mean differences for A levels between (a) Faculty I and 2 students, and, (b) Faculty 2 and 3 students. However, the mean difference between Faculty I and 3 students is statistically significant, the latter being superior.

Inspection of Tables 8, 9, I0 and II shows no significant mean differences between (a) males belonging to Faculties I and 2, and, (b) males belonging to Faculties 2 and 3, and, (c) females belonging to different faculties.

Consideration of Tables 8 and 9 shows a significant mean difference between Faculty I and 3 males, the latter being significantly superior.

Examination of Tables I2, I3, I4, I5, I6, I7, I8 and I9 shows no significant mean difference for A levels exists between (a) degree course males in Faculties I and 2 and Faculties 2 and 3, and, (b) degree course females belonging to different faculties, and,

(c) non degree course males belonging to different faculties, and,
(d) non degree course females belonging to different faculties.
There is a significant mean difference between Faculty I and 3 degree course males, the latter being singificantly superior (Tables I2 and I3)

Consideration of Tables 20 and 2I shows no significant mean difference for A levels between degree course students belonging to Faculties I and 2 and Faculties 2 and 3, but there is a significant mean difference between Faculty I and 3 degree course students, the latter being significantly superior.

Inspection of Tables 2I and 22 shows no significant mean differences between non degree course students belonging to different faculties. The null hypothesis that no significant mean differences in A levels exist between groups of faculty students in the total sample is rejected for Faculty I and 3 students, but accepted for Faculty 2 and I students and also for Faculty 2 and 3 students.

The null hypothesis that no significant mean differences for A levels exist between (a) males belonging to different faculties, and, (b) females belonging to different faculties is accepted for males in Faculties I and 2 and males in Faculties 2 and 3 and for females in different faculties. The above hypothesis is rejected for males in Faculties I and 3.

The null hypothesis that no significant mean difference for A levels exists between students of different faculties classified according to sex and type of course pursued, is accepted for (a) degree course males in Faculties I and 2 and Faculties 2 and 3, and, (b) degree course females belonging to different faculties, and, (c) non degree course males and females belonging to different faculties. The above hypothesis is rejected for Faculties 2 and 3 degree course males.

The null hypothesis that no significant mean difference for A levels exists between (a) degree course students belonging to different faculties, and, (b) non degree course students belonging to different faculties, is accepted for degree course students in Faculties I and 2 and in Faculties 2 and 3 and also for all non degree course students belonging to different faculties. The above hypothesis is rejected for Faculty I and 3 students.

(c) Differences between degree course and non degree courses

Reference to Table 23 shows that for the total sample of students a significant mean difference for A levels exists between degree course and non degree course students, the former being superior.

Examination of Table 24 shows a significant mean difference for A levels between degree course and non degree course students within each faculty, the degree course students being significantly superior.

Inspection of Table 25 shows a significant mean difference for A levels between male degree course and male non degree course students within each faculty, the former being significantly superior.

Consideration of Table 26 shows a significant mean difference for A levels between female degree course and female non degree course students within Faculties 2 and 3, the female degree course students being significantly superior. However, within Faculty I there is no significant mean difference for A levels between female degree course and female non degree course students.

The null hypothesis that no significant mean differences for A levels exists between degree course and non degree course students is rejected for the total sample of students as it is between degree course and non degree course students within the faculties.

The null hypothesis that no significant mean difference for A levels exists between (a) male degree course and male non degree course students and, (b) female degree course and female non degree course students within each faculty, is rejected for males within each faculty and for females within Faculties 2 and 3. However, for females within Faculty I the null hypothesis is accepted.

Discussion

It is an interesting speculation that female students need higher A levels for entry into polytechnic courses but this is not supported by regulations regarding admissions policy in course handbooks. Alternatively it could be speculated that the polytechnic is less frequently a first choice institution for males who opt for other institutions requiring higher grades. No evidence exists for this speculation but there is evidencein the Literature (Sizer, 1979) for a preferred rank ordering of institutions of Higher Education to be held by undergraduates.

There is nodocumentation in the Literature accounting for higher A levels in degree as opposed to non degree course students but the reasons for the discrepancy are open to common sense arguments concerning the nature of the level of work required by degree as opposed to non degree level courses . Additionally, there are the course entry requirements to consider which stipulate the necessary performance at A level for entry onto courses.

There is evidence in the Literature for differences in A levels to occur between faculties (Scottish Council for Research In Education, 1936; Ramsden and Entwistle, 1981) and for differences to occur between subject areas (Forster, 1959; Nicholson and Galambos, 1960; Dale, 1972).

It is interesting to observe that although the superiority in A levels is matched with superiority in measured intelligence for females generally, this does not occur in any other of the sub groups with superior A levels. An implication of this is that the two ability measures are not assessing the same thing. As A levels are usually regarded as indicators of ability to cope with degree subjects it would be interesting to compare the predictive validity of A levels and measured intelligence for forecasting performance at degree level.

5.8.6 Anxiety

(a) Differences between males and females

Inspection of Tables I, 2, 3, 4 and 5 shows that for the total sample of students and for various sub groups classified according to faculty membership and type of course pursued, no significant mean differences for anxiety occur.

The null hypothesis that no significant differences for anxiety occur between the sexes for (a) the total sample, and, (b) males and females within each faculty, and, (c) males and females pursuing degree course and non degree courses, is upheld and accepted.

(b) Differences between faculty membership

Reference to Tables 6 and 7 shows that for the total sample of students there are significant mean differences for anxiety between
(a) Faculty I and 2 students, the former being more anxious, and,

(b) Faculty 2 and 3 students, the latter being more anxious.The mean difference for anxiety between Faculty I and 3 students is not statistically significant.

Inspection of Tables 8, 9, I0 and II shows no significant mean difference for anxiety between (a) males in Faculties I and 3, and, (b) females belonging to different faculties. Significant mean differences for anxiety occur between (a) males belonging to Faculties I and 2, the former being significantly more anxious, and, (b) males belonging to Faculties 2 and 3, the latter being significantly more anxious.

Examination of Tables I2, I3, I4 and I5 show no significant mean differences for anxiety between (a) degree course males in Faculties I and 3, and, (b) degree course females belonging to different faculties. Significant mean differences occur for degree course males in Faculties I and 2, the former being significantly more anxious, and for degree course males in Faculties 2 and 3, the latter being significantly more anxious.

Inspection of Tables I6, I7, I8 and I9 shows no significant mean differences for anxiety between (a) non degree course males, and, (b) non degree course females.

Consideration of Tables 20 and 2I shows no significant mean difference for anxiety between Faculty I and 3 degree course students. However, the same tables show significant mean differences for (a) degree course students belonging to Faculties I and 2, the former being significantly more anxious, and, (b) degree course students belonging to Faculties 2 and 3, the latter being more anxious.

Consideration of Tables 20 and 22 shows no significant mean difference in anxiety between non degree course students belonging to different faculties.

The null hypothesis that no significant mean difference in anxiety exists between different groups of faculty students in the total sample is rejected for Faculty I and 2 students, also for Faculty 2 and 3 students, but is accepted for Faculty I and 3 students.

The null hypothesis that no significant mean difference for anxiety exists between (a) males belonging to different faculties, and, (b) females belonging to different faculties, is accepted for males in Faculties I and 3, and for females in different faculties. The above hypothesis is rejected for males belonging to different faculties and for males belonging to Faculties 2 and 3.

The null hypothesis that no significant mean difference for anxiety exists between students of different faculties, classified according to sex and type of course pursued, is accepted for (a) degree course males in Faculties I and 3, and, (b) degree course females in different faculties, and, (c) non degree course males belonging to different faculties. The above hypothesis is rejected for (a) degree course males belonging to Faculties I and 2, and, (b) degree course males belonging to Faculties 2 and 3.

The null hypothesis that no significant mean difference for anxiety exists between (a) degree course students belonging to different faculties, and, (b) non degree course students belonging to different faculties, is accepted for degree course students belonging to Faculties I and 3, and for non degree course students belonging to different faculties. The above hypothesis is rejected for degree course students belonging to Faculties I and 2, and for degree course students belonging to Faculties 2 and 3.

(c) Differences between degree course and non degree courses

Reference to Table 23 shows that for the total sample of students there is no significant mean difference for anxiety between degree course and non degree course students.

Examination of Table 24 shows no significant mean difference for anxiety to exist between degree course and non degree course students within each faculty.

Inspection of Tables 25 and 26 shows no significant mean differences exist between (a) male degree course and male non degree course students within each faculty, and, (b) female degree course and female non degree course students within each faculty.

The null hypothesis that no significant mean difference for anxiety exists between degree course and non degree course students, is accepted for (a) the total sample of students, and, (b) degree course and non degree course students within the faculties, and, (c) male degree course and male non degree course students within the faculties and, (d) female degree course and female non degree course students within the faculties.

Discussion

It might have been predicted that some significant differences exist for anxiety between groups of students, especially within those groups for whom differences in neuroticism were found to occur.

Haggard (I957) has suggested that patternings between variables related to anxiety tend to be found where differences in anxiety occur between students. He suggests that intelligent students, for example, can utilise neuroticism by increasing their drive for success and generating anxiety into motivational force. In the present Study, only one instance of high neuroticism occurring with superior intelligence was found and there was no correspondingly high anxiety.

It is possibly the case that the anxiety scale used to measure anxiety in the present Study is inadequate and for this reason produces no differences in students' anxiety levels. The scale is a sub scale of a general inventory (London University Questionnaire) concerned with students' dispositional and behavioural characteristics and is not refined enough to discriminate anxiety levels.

This would appear to be valid doubt when it is considered that the Literature generally (Bendig, I960; Ruebush, I963; Wheeler, I965; Phillips, I966; Saville and Blinkhorne, I976; Thomas, I980) reports sex differences for anxiety, females being more anxious than males.

5.8.7 Motivation

(a) Differences between males and females

Reference to Tables I, 2, 3, 4 and 5 shows no significant mean sex difference for motivation in the total student sample, nor in the sub groups classified according to faculty membership and type of course.

The null hypothesis that no significant mean difference for motivation exists between the sexes in (a) the total sample, and, (b) within faculties, and, (c) degree course or non degree courses, is accepted.

(b) Differences between faculty membership

Reference to Tables 6 and 7 shows that, for the total sample of students there are no significant mean differences for motivation between students of different faculties.

Inspection of Tables 8, 9, I0 and II shows that there are no significant mean differences for motivation between (a) males belonging to different faculties, and, (b) females belonging to different faculties.

Examination of Tables I2, I3, I4, I5, I6, I7, I8 and I9 shows no significant mean differences to exist between (a) degree course males belonging to different faculties, and, (b) degree course females belonging to different faculties, and, (c) non degree course males belonging to different faculties, and, (d) non degree course females belonging to different faculties.

Consideration of Tables 20 and 2I and 22 shows no significant mean differences between (a) degree course students belonging to different faculties, and, (b) non degree course students belonging to different faculties.

(c) Differences between degree course and non degree courses

Examination of Table 23 shows that for the total sample of students there is no significant mean difference for motivation between degree course and non degree course students.

Reference to Table 24 shows no significant mean difference exists between degree course and non degree course students within each faculty. Inspection of Tables 25 and 26 shows no significant mean difference exists between (a) male degree course students and male non degree course students within the faculties, and, (b) female degree course and female non degree course students within the faculties.

The null hypothesis that no significant mean difference for motivation exists between degree course and non degree course students is accepted for (a) the total sample of students, and, (b) degree course and non degree course students within each faculty, and, (c) male degree course and male non degree course students within each faculty and, (d) female degree course and female non degree course students within each faculty.

Discussion

There is some suggestion in the Literature that motivational levels bear a relationship with variables of academic self concept (Entwistle and Wilson, 1977) and with examination performance (Entwistle, 1974). In fact, Entwistle and Wilson (1977) suggest a relationship exists between motivation, self concept and methods of studying to the extent of the relationship defining a *type*. Other studies (Biggs, 1979; Fransson, 1977) suggest a general notion of motivation being related to individual difference characteristics like study habits, but there is nothing in the Literature to suggest that variability exists in the motivational levels of students classified into various groups.

As differences do exist in the present Study for variables of academic self concept, neuroticism and study habits, it might have been predicted that differences in motivation would also occur. No differences are established in the results and this might, as in the case of anxiety, reflect the invalidity of the measurement scale as much as anything else. Subsequent research would confirm or reject this guess.

5.8.8 Academic Self Concept

(a) Differences between males and females

Examination of Tables I, 2 and 3 shows no significant mean difference for academic self concept to exist between the sexes within (a) the total sample, and, (b) for degree course and non degree course students, and, (c) for students within each faculty, irrespective of type of course pursued.

However, when sex differences within the faculties are examined for students classified as those pursuing degree course and non degree courses, male degree course students in Faculty I are superior to females.

For the degree course students in Faculties 2 and 3, neither sex is significantly superior to the other (Table 4). In the case of the non degree course students in Faculty 3, the males are significantly superior to the females but for the non degree course students in Faculties I and 2, neither sex is significantly superior to the other.

The null hypothesis that no significant sex differences for academic self concept exists between the sexes for (a) the total sample of students, and, (b) degree course and non degree course students respectively, and, (c) students within each faculty, irrespective of type of course pursued, is accepted.

The null hypothesis is rejected for the sexes in degree courses within Faculty I and for non degree courses within Faculty 3. The null hypothesis is accepted for the sexes pursuing degree courses in Faculties 2 and 3 and for students pursuing non degree courses in Faculties I and 2.

(b) Differences between faculty membership

Reference to Tables 6 and 7 shows that for the total sample of students there are no significant mean differences for academic self concept between (a) Faculties I and 3, and, (b) Faculties 2 and 3. There is, however, a significant mean difference between Faculty I and 2, the latter students being significantly superior.

Inspection of Tables 8, 9, I0 and II show no significant mean differences between (a) males in Faculties 2 and 3, and, (b) females in Faculties I and 3 and Faculties 2 and 3.

Significant mean differences occur between (a) males belonging to Faculties I and 2, the latter being significantly superior, and, (b) males belonging to Faculties I and 3, the latter being significantly superior, and, (c) females belonging to Faculties I and 2, the latter being significantly superior.

Examination of Tables I2, I3, I4 and I5 show no significant mean differences for academic self concept between (a) degree course males belonging to different faculties, and, (b) degree course females belonging to different faculties of Faculty I and 3 and Faculty 2 and 3.

For degree course females there is a significant mean difference between females belonging to Faculties I and 2, the latter being significantly superior.

Consideration of Tables I6, I7, I8 and I9 shows no significant mean differences for academic self concept between (a) non degree course males in Faculties I and 2 and Faculties 2 and 3, and, (b) non degree course females in Faculties I and 3. For non degree course males there is a significant mean difference between Faculty I and 3 students, the latter being significantly superior, while for non degree course females there are significant differences for academic self concept (a) between females in Faculties I and 2, the latter being significantly superior, and, (b) between females in Faculties 2 and 3, the latter being significantly superior.

Consideration of Tables 20, 2I and 22 shows no significant mean differences for academic self conept between (a) degree course students belonging to different faculties, and, (b) non degree course students belonging to Faculties 2 and 3. However, there are significant mean differences for academic self concept between (a) non degree course students in Faculties I and 2, the latter being significantly superior, and, (b) non degree course students in Faculties I and 3, the latter being significantly superior (Tables 20 and 22).

The null hypothesis that no significant mean differences for academic self concept exists between different groups of faculty students in the total sample is accepted for Faculty I and Faculty 3 and also for Faculty 2 and Faculty 3, but it is rejected for Faculty I and Faculty 2 students.

The null hypothesis that no significant mean difference for academic self concept exists between (a) males belonging to different faculties, (b) females belonging to different faculties, is accepted for males in Faculties I and 2, and females in Faculties I and 3 and Faculties 2 and 3. The above hypothesis is rejected for (a) degree course females in Faculties I and 2, and, (b) non degree course males in Faculties I and 3, and, (c) non degree course females in Faculties I and 2 and Faculties 2 and 3.

The null hypothesis that no significant mean differences for academic self concept exist between (a) degree course students belonging to different faculties, and, (b) non degree course students belonging to different faculties, is accepted for degree course students belonging to different faculties and for non degree course students belonging to Faculties 2 and 3. The above hypothesis is rejected for (a) non degree course students in Faculties I and 2, and, (b) non degree course students in Faculties I and 3.

(c) Differences between degree course and non degree courses

Reference to Table 23 shows that for the total sample of students there is no significant mean difference for academic self concept between degree course and non degree course students.

Consideration of Table 24 shows no significant mean difference for academic self concept between degree course and non degree course students within each faculty exists. Reference to Tables 25 and 26 shows that no significant mean difference exists between (a) male degree course and male non degree course students within each faculty, and, (b) female degree course and female non degree course students within each faculty.

The null hypothesis that no significant mean difference for academic self concept exists between degree course and non degree course students within each faculty is accepted for (a) the total sample of students, and, (b) degree course students and non degree course students within each faculty, and, (c) male degree course and male non degree course students within each faculty, and, (d) female degree course and female non degree course students within each faculty.

Discussion

The higher academic self concept of the degree course males in the engineering and science type courses within Faculty I is possibly accounted for by the small numbers of females enrolled with them. It might be presumed that the distribution of scores for females is smaller and less spread out and that the males achieve higher as well as lower scores.

Alternatively it could be presumed that the females, as a minority group, feel some inhibition in the male dominated courses. This is speculative only and it would be interesting to test.

The non degree course male students have higher academic self concept than the non degree females and this result suggests similar speculative explanation. Overall, there is no difference between male and female students and this is the most typical result observed in the sub groups of the total sample. The Literature however, does support the notion of sex differences in academic self concept. Notable is the work of Palardy (1969) who suggests that female students under go a developmental trend of deteriorating self concept that begins at or before secondary school age. Confirmation of the lower academic self concept of females in education is given by Davies and Meighan (1975) although the present Study is not supportive of these studies.

Generally, the academic self concept of students in the total sample was low compared with norms (Brookover, 1965) and it would be interesting to compare the scores of polytechnic and university students on an academic self concept scale in future research.

5.8.9 Time Spent Studying

(a) Differences between males and females

Consideration of Tables I, 2, 3, 4 and 5 shows only two significant mean differences between the sexes for time spent studying. The females in Faculties 2 and 3 spend significantly more time studying than the males in Faculties 2 and 3 (Table 3).

The mean sex difference for (a) the total sample, and, (b) degree and non degree course students respectively, and, (c) Faculty I students, irrespective of type of course pursued, and, (d) degree course students within each faculty, and, (e) non degree course students within each faculty, are not statistically significant.

The null hypothesis that no significant mean difference for time spent studying exists between the sexes for (a) the total sample of students, and, (b) degree course and non degree course students respectively, and, (c) degree course students within each faculty, is accepted.

The null hypothesis that, irrespective of type of course pursued, there is no significant difference between the sexes for time spent studying, is accepted for students in Faculty I but not for students in Faculties 2 and 3.

(b) Differences between faculty membership

Reference to Tables 6 and 7 shows that for the total sample of students there is no significant mean difference for time spent studying between Faculty I and Faculty 3 students, but there are significant mean differences between (a) Faculties I and 2 students, the former being significantly superior, and, (b) Faculties 2 and 3 students, the latter being significantly superior.

Inspection of Tables 8, 9, IO and II shows no significant mean difference for time spent studying to exist between (a) males belonging to Faculties I and 3, and, (b) females belonging to Faculties I and 2 and Faculties I and 3.

Significant mean differences occur for (a) males belonging to Faculties I and 2, the former being significantly superior, and, (b) males belonging to Faculties 2 and 3, the latter being significantly superior, and, (c) females belonging to Faculties 2 and 3, the latter being significantly superior.

Examination of Tables I2, I3, I4 and I5 shows no significant mean differences between (a) degree course males belonging to Faculties I and 3, and, (b) degree course females belonging to Faculties I and 2. For degree course males there are significant mean differences between (a) Males in Faculties I and 2, the former being significantly superior and, (b) males in Faculties 2 and 3, the former being significantly superior.

For degree course females, there are significant mean differences for time spent studying between (a) females in Faculties I and 3, the latter being significantly superior, and, (b) females in Faculties 2 and 3, the latter being significantly superior. Consideration of Tables I6, I7, I8 and I9 shows no significant mean differences for time spent studying between (a) non degree course males in Faculties I and 2 and Faculties I and 3, and, (b) non degree course females in different faculties.

A significant mean difference occurs for non degree males in Faculties

2 and 3, the latter being significantly superior.

Consideration of Tables 20, 2I and 22 shows no significant mean differences between (a) degree course students in Faculties I and 3 and Faculties 2 and 3, and, (b) non degree course students in Faculties I and 2 and Faculties I and 3. However, there are significant mean differences between (a) degree course students in Faculties I and 2, the former being significantly superior, and, (b) non degree course students in Faculties 2 and 3, the latter being significantly superior.

The null hypothesis that no significant mean difference for time spent studying exists between different groups of faculty students in the total sample, is accepted for Faculty I and 3 students, but rejected for Faculty 2 and 3 students.

The null hypothesis that no significant mean differences for time spent studying exists between (a) males in different faculties, and, (b) females in different faculties, is accepted for males in Faculties I and 3, and for females in Faculties I and 2 and Faculties I and 3. The above hypothesis is rejected for males in Faculties 2 and 3 and for females in Faculties 2 and 3.

The null hypothesis that no significant mean difference for time spent studying exists between students of different faculties, classified according to sex and type of course pursued, is accepted for (a) degree course males in Faculties I and 3, and, (b) degree course females in

Faculties I and 2, and, (c) non degree course males in Faculties I and 2 and Faculties I and 3, and, (d) non degree course females in different faculties.

The above hypothesis is rejected for (a) degree course males in Faculties I and 2 and Faculties 2 and 3, and, (b) degree course females in Faculties I and 3 and Faculties 2 and 3, and, (c) non degree course males in faculties 2 and 3.

The null hypothesis that no significant mean difference for time spent studying exists between (a) degree course students in different faculties, and, (b) non degree course students in different faculties, is accepted for degree course students in Faculties I and 3 and Faculties 2 and 3, and for non degree course students in Faculties I and 2 and Faculties 2 and 3.

The above hypothesis is rejected for (a) degree course students in Faculties I and 2, and, (b) non degree course students in Faculties 2 and 3.

(c) Differences between degree course and non degree courses

Reference to Table 23 shows that for the total sample of students a significant mean difference for time spent studying exists between degree course and non degree course students, the former being significantly superior.

Consideration of Table 24 shows no significant mean differences for time spent studying exist between degree course and non degree course students within Faculties 2 and 3 but there is a significant mean difference between degree course and non degree course students within Faculty I, the degree course students being significantly superior.

Inspection of Tables 25 and 26 shows no significant mean difference between (a) male degree course students and male non degree course students in ;aculties 2 and 3, and, (b) female degree course and female non degree course students within each faculty. A significant mean difference exists between male degree course and male non degree course students within Faculty I, the former being superior.

The null hypothesis that no significant mean difference for time spent studying exists between degree course and non degree course students is rejected for (a) the total sample of students, and, (b) degree course versus non degree course students in Faculty I, and, (c) male degree course versus male non degree course students within Faculty I. It is accepted for (a) degree course versus non degree course students within Faculties 2 and 3, and, (b) male degree course versus male non degree course students within Faculties 2 and 3.

Discussion

Although no overall sex difference for time spent studying is reported the difference within Faculty I, which is a predominantly engineering and science courses type faculty, is interesting to note. It is possible that a compensatory factor is in evidence here with females being outnumbered by males and so working longer hours to overcome perceived lesser competence. It is worth noting that females in Faculty I also achieved lower scores on the academic self concept scale which would support this proposition.

There is evidence in the Literature for a compensatory effect of study time (Williamson, 1935). It is observed that students of both sexes within Faculty I are of superior measured intelligence as compared with students of other faculties and that females within Faculty I are superior to Faculty I males. This result does not support a notion of a compensatory effect for time spent studying unless perceptions of ability in the student group do not match measured ability.

Infact, the academic self concept of Faculty I females is not lower than that of other faculty groups. It might be the case that Faculty I students are motivated more to do private studying. Parlett (1977) has documented the effects on students' study behaviour of the learning milieu generated by faculty membership and Simons and Parlett (1977) and Entwistle (1983) have described how a departmental *style* or *philosophy* is internalised by students and directly affects their approaches and attitudes to studying.

The present Study's results can be interpreted in these terms and conversation with students does lend an illustrative credibility to the notion that milieu affects perceptions regarding study requirements which incorporates the amount of time needed for studying.

5.8.10 Study Habits

(a) Differences between males and females

Inspection of Tables I, 2, 3, 4 and 5 shows no significant mean difference for study habits in (a) the total sample of students, and, (b) non degree course students irrespective of faculty membership, and, (c) students within faculties I and 3, irrespective of course pursued, and, (d) degree course students within Faculties I and 3, and, (e) non degree course students within Faculties I,2,3.

Significant mean differences for sex occur between (a) degree course students, females being significantly superior, and, (b) students in Faculty 2, females being significantly superior, and, (c) degree course students in Faculty 2, females being significantly superior.

The null hypothesis that no significant mean difference for study habits exists between the sexes is upheld for (a) the total sample of students, and, (b) non degree students, and, (c) students in Faculties I and 3, and, (d) degree course students in Faculties I and 3, and, (e) non degree course students.

The null hypothesis is rejected for (a) students in Faculty 2, and, (b) degree course students in Faculty 3.

(b) Differences between facutty membership

Reference to Tables 6 and 7 shows that for the total sample of students there is no significant mean difference for study habits between (a) Faculty I and 2 students, and, (b) Faculty I and 3 students. There is a significant mean difference between Faculty 2 and 3 students, the latter being significantly superior.

Inspection of Tables 8, 9, IO and II shows no significant mean differences exist between (a) males in Faculties I and 3, and, (b) females in different faculties. Significant mean differences occur for (a) males in Faculties I and 2, the former being superior, and, (b) males in Faculties 2 and 3, the latter being superior.

Examination of Tables I2, I3, I4, I5, I6, I7, I8 and I9 shows no significant mean differences occur between (a) degree course males belonging to different faculties, and, (b) degree course females belonging to different faculties, and, (c) non degree course males belonging to Faculties I and 3, and, (d) non degree course females belonging to Faculties I and 2 and Faculties I and 3.

Significant mean differences occur for (a) non degree course males in Faculties I and 2, the former being significantly superior, and,

(b) non degree course males in Faculties 2 and 3, the latter being significantly superior, and, (c) non degree course females in Faculties 2 and 3, the latter being significantly superior.

Inspection of Tables 20, 2I and 22 shows no significant mean differences exist between (a) degree course students belonging to different faculties, and, (b) non degree course students belonging to Faculties I and 3. Significant mean differences occur for (a) non degree course students in Faculties I and 2, the former being significantly superior and, (b) non degree course students in Faculties 2 and 3, the latter being significantly superior.

The null hypothesis that no significant mean difference for study habits exists between different groups of faculty students is accepted for Faculty I and 2 students, also for Faculty I and 3 students, but is rejected for Faculty 2 and 3 students.

The null hypothesis that no significant mean difference for study habits exists between (a) males in different faculties, and, (b) females in different faculties, and, (c) males in Faculties I and 3 is rejected for males in Faculties I and 2, also for males in Faculties 2 and 3.

The null hypothesis that no significant mean difference for study habits exists between students of different faculties classified according to sex and type of course pursued is accepted for

(a) degree course males in each faculty, and, (b) degree course females in each faculty, and, (c) non degree course males in Faculties I and 3, and, (d) non degree course females in Faculties I and 2 and Faculties I and 3. The above hypothesis is rejected for (a) non degree course males in Faculties I and 2 and Faculties 2 and 3, and, (b) non degree course females in Faculties 2 and 3.

The null hypothesis that no significant mean differences exists for study habits between (a) degree course students in different faculties, and, (b) non degree course students in different faculties, is accepted for the degree students in different faculties and the non degree course students in Faculties I and 3. The above hypothesis is rejected for (a) non degree course students in Faculties I and 2, and, (b) non degree course students in Faculties 2 and 3.

(c) Differences between degree course and non degree courses

Examination of Table 23 shows that for the total sample of students the degree course students are significantly superior to the non degree course students for study habits.

Reference to Table 24 shows no significant mean difference for study habits between degree course and non degree course students within Faculties I and 3 but a significant mean difference does exist between degree course and non degree course students in Faculty 2, the former being significantly superior.

Consideration of Tables 25 and 26 shows no significant mean differences exist for (a) male degree course students versus male non degree course students within Faculties I and 3, and, (b) female degree course versus female non degree course students within Faculty 3. A significant mean difference exists between male degree course and male non degree course students in Faculty 2, the former being superior, also for female degree course versus female non degree course students in Faculties I and 2, the former being superior.

The null hypothesis that no significant mean difference for study habits between degree course and non degree course students exists, is rejected for (a) the total sample of students, and, (b) degree course versus non degree course students, and, (c) male degree course versus male non degree course students, and, (d) female degree course versus female non degree course students in Faculties I and 2. The above hypothesis is accepted for (a) degree course versus non degree course students in Faculties I and 3, and, (b) male degree course students versus male non degree course students in Faculties I and 3, and, (c) female degree course versus female non degree course students in Faculty 3.

Discussion

The superiority of females for study habits is not surprising as popular stereotypes of male and female students tend towards a belief that female students are generally conscientious and hard working. The superiority of females in certain sub groups and not others is a less predictable result. Faculty 2 females and Faculty 2 degree course females have superior study habits to the males in these groups. A speculation is that the females, whose numbers are much smaller than for the males, have used their superior skills to good effect in the past and constitute a successful student group. It is arguably more competitive for females to gain entry onto the engineering and science type courses which identifies females in Faculty 2 as having some sort of excellence.

The overall superiority of degree course over non degree course students is observed. Previous examination performance at A level is one of the factors evaluated by admissions tutors of degree courses and, if study habits are established to bear a relationship with examination performance, it might be predicted that these "examination successes" indicate competence in study habits.

Potential for counselling in the effective use of efficient study habits for student groups identified as having poor existing habits seems to exist. In conversation with third year students concerning the availability of diagnostic and remedial help in study habits an objection was raised by students who perceived this to help effect a levelling off of individual competency. In other words, these students are intuitively aware of the effect that efficient study habits have on academic performance and consider them an aspect of individual differences between undergraduates.

5.8.II Separate Study Habits:

(a) Differences between males and females

Examination of Table 27 shows no significant mean difference for sub test I as a separate study habit between males and females in Faculties I and 3 but a significant mean difference between males and females in Faculty 2, the females being significantly superior. Consideration of Table 27 shows no significant mean difference for sub tests 2, 6, and 7, as separate study habits, between the sexes within each faculty.

Reference to Table 27 shows no significant mean differences for sub test 3 between males and females in Faculty 3 but a significant difference within faculties I and 2, the females in both being significantly superior.

Inspection of Table 27 shows no significant mean difference for sub tests 4 and 5 between the sexes in Faculties I and 3 but a significant mean difference for these sub tests between the sexes in Faculty 2, the females being significantly superior.

The null hypothesis that no significant mean differences on sub tests I, 2, 3, 4, 5, 6 and 7 exist between male and female students within the faculties, is rejected for (a) the sexes in each faculty for sub tests 2, 6 and 7, and, (b) the sexes in Faculty 2 for sub test I, and, (c) the sexes in Faculty I and Faculty 2 for sub test 3, and, (d) the sexes in Faculty 2 for sub tests 4 and 5.

The above null hypothesis is accepted for (a) the sexes in Faculties I and 3 for sub test I, and, (b) the sexes in Faculty 3 for sub test 3, and, (c) the sexes in Faculties I and 3 for sub tests 4 and 5.

(b) Differences between faculty membership

Consideration of Tables 28 and 29 shows no significant mean differences for sub tests I, 2, 3, 4 and between students belonging to different faculties. Neither are there any significant mean differences for (i) sub test 3 in Faculties I and 2, and, (ii) sub tests 6 and 7 in Faculties I and 3.

Significant mean differences occur for (a) Faculties I and 3 on sub test 3, the latter being significantly superior, and, (b) Faculties 2 and 3 on sub test 3, the latter being significantly superior, and, (c) Faculties I and 2 on sub test 6, the former being superior, and, (d) Faculties 2 and 3 for sub test 6, the latter being superior, and, (e) Faculties I and 2 on sub test 7, the former being superior, and, (f) Faculties 2 and 3 on sub test 7, the latter being superior.

The null hypothesis that no significant mean differences exist for sub tests I, 2, 3, 4, 5, 6 and 7 between students belonging to different faculties, is rejected for (a) Faculties I and 3 on sub test 3, and, (b) Faculties 2 and 3 on sub test 3, and, (c) Faculties I and 2 on sub tests 6 and 7, and, (d) Faculties 2 and 3 on sub test 7. The above hypothesis is accepted for (a) the various faculties on sub tests I, 2, 4 and 5, and, (b) Faculties I and 2 on sub test 3, and, (c) Faculties I and 3 on sub tests 6 and 7.

Examination of Tables 30 and 3I shows no significant mean differences exist between (a) degree course students in each faculties on sub tests 2, 5 and 6, and, (b) degree course students in Faculties I and 3 and Faculties 2 and 3 on sub test I, and, (c) degree course students in Faculties I and 2 on sub test 3, and, (d) degree course students in Faculties I and 3 and Faculties 2 and 3 on sub test 4, and, (e) degree course students in Faculties I and 3 and Faculties 2 and 3 on sub test 7.

Significant mean differences for the various sub tests occur between the following groups identified for each separate study habit :

(a) Sub test I :- Faculty I versus Faculty 2, the latter being superior.
(b) Sub test 3 :- Faculty I versus Faculty 3, the latter being superior.
(c) Sub test 4 :- Faculty I versus Faculty 2, the latter being superior.
(d) Sub test 7 :- Faculty I versus Faculty 2, the former being superior.

The null hypothesis that no significant mean differences for sub tests I, 2, 3, 4, 5, 6 and 7 between degree course students belonging to different faculties, is rejected for (a) Faculties I and 3 on sub test I, and, (b) Faculties I and 3 and Faculties 2 and 3 on sub test 3, and, (c) Faculties I and 2 on sub test 4, and, (d) Faculties I and 2 on sub test 4.

The above null hypothesis is accepted for (a) the various faculties on sub tests 2, 5 and 6, and, (b) Faculties I and 3 and Faculties 2 and 3 on sub test I, and, (c) Faculties I and 2 on sub test 3, and, (d) Faculties I and 3 and Faculties 2 and 3 on sub test 4, and, (e) Faculties I and 3 and Faculties 2 and 3 on sub test 7.

Inspection of Tables 30 and 32 shows no significant mean difference exists on (a) sub tests I, 2, 4, 5, 6 and 7 between non degree course students in Faculties I and 3, and, (b) sub tests 3 and 5 between non degree course students in Faculties I and 2, and, (c) sub test 4 between non degree course students in Faculties 2 and 3.

Significant mean differences on the sub tests occur between the following groups identified for each separate study habit :-

(a) Sub test I :- Faculty I versus Faculty 2, the former is superior.
Faculty 2 versus Faculty 3, the latter is superior.

(b) Sub test 2 :- Faculty I versus Faculty 2, the former is superior.
Faculty 2 versus Faculty 3, the latter is superior.

(c) Sub test 3 :- Faculty I versus Faculty 3, the latter is superior.
Faculty 2 versus Faculty 3, the latter is superior.

(d) Sub test 4 :- Faculty I versus Faculty 2, the former is superior.

(e) Sub test 5 :- Faculty 2 versus Faculty 3, the latter is superior.

(f) Sub test 6 :- Faculty I versus Faculty 2, the former is superior.
Faculty 2 versus Faculty 3, the latter is superior.

(g) Sub test 7 :- Faculty I versus Faculty 2, the former is superior.
Faculty 2 versus Faculty 3, the latter is superior.

The null hypothesis that no significant mean differences on sub tests I, 2, 3, 4, 5, 6 and 7 exists between non degree course students in each faculty, is rejected for the following groups :-

(a) Faculties I and 2 and Faculties 2 and 3 on sub test I.

(b) Faculties I and 2 and Faculties 2 and 3 on sub test 2.

(c) Faculties I and 3 and Faculties 2 and 3 on sub test 3.

(d)Faculties I and 2 on sub test 4.

(e) Faculties 2 and 3 for sub test 5.

(f) Faculties I and 2 and Faculties 2 and 3 on sub test 6.

(g) Faculties I and 2 and Faculties 2 and 3 on sub test 7.

(c) Differences between degree course and non degree courses

Reference to Table 33 shows that, with respect to mean differences for sub tests between degree course and non degree course students, within each faculty, the following results are observed :-

(a) For Faculty I no significant mean differences between degree course and non degree course students exist on sub tests I, 2, 3, 5, 6 and 7. However, there is a significant mean difference for sub test 4, the non degree course students being significantly superior.

(b) For Faculty 2 there are significant mean differences on sub tests I, 2, 4, 5, 6 and 7, the degree course students being significantly superior. On sub test 3 there is no significant mean difference between degree course and non degree course students.

(c) For Faculty 3 no significant mean differences exist.

The null hypothesis that within each faculty there are no significant mean differences between degree course and non degree course students for separate study habits is accepted for the following groups :-

(a) For Faculty 3 students, and- (b) For Faculty I students on sub tests I, 2, 3, 5, 6 and 7, and, (c) For Faculty 2 students on sub test 3. The above hypothesis is rejected for the following groups: (a) Faculty I students on sub test 4, and, (b) Faculty 2 students on sub tests I, 2, 4, 5, 6 and 7.

Discussion

Females are overall superior to males in four of the separate study habits and these are examination techniques, note taking in lectures, textbook reading and organisation of studying. Arnold (I942) has suggested that no separate study habit has any more or less importance than others for academic performance but later studies challenge this view.

Noall (I962) identifies note taking in lectures and reading skills as being of special importance and Koile and Bird (I956) and Clemens and Oelke (I967) confirm the belief that these are of high importance for academic achievement.

This would suggest an advantage over the males for female students in each of the faculties where superiority occurs. This is most often the case for Faculty 2 females. However, Blake (I953) finds no evidence for certain separate study habits having greater importance and suggests further that it is fallacious to believe that academic achievement has a relationship with any set of uniform skills reputed to be common to good students.

It is interesting to observe that Faculty 2 students of both sexes combined tend to be inferior to other faculty students on two of the study habits for which the Faculty 2 females showed no superiority. In other words, for time of study and place of study, all Faculty 2 students are inferior and for all but one of the remaining habits, females are superior to males in Faculty I. It rather looks as though the mathematics and computer science students tend towards poorer study habits than other groups.

It is not easily explained that little superiority of degree course students over non degree course students occurs for the separate study habits nor why lecture note taking and textbook reading should be the only two for which a difference occurs. A common denominator of these skills is that they are cognitive ones involving perception and abstraction of key elements. It would be interesting to find some confirmatory evidence for this in future research.

5.8.12 Initial and Subsequent Test Scores for Separate Study Habits and Combined Study Habits

Reference to Table 34 shows that initial scores and subsequent scores on sub tests I, 2, 3, 4, 5, 6 and 7, and combined study habit scores, are very similar. In fact, mean differences between initial and subsequent testing are not statistically significant.

This non significant difference may be accounted for by either, (a) few changes occuring in the study habits of students, and/or, (b) there being a reliance on common techniques of study behaviour at the time of both testings. The result leads to an acceptance of the null hypothesis.

The interpretation given to the non significance of differences between initial and subsequent testing is supported to some extent by an examination of Table 34 which, in general, shows a substantial and positive correlation between initial and subsequent test scores.

Consideration of Table 34 shows that the greatest changes have occurred in sub tests 3 and 7 which are lecture note taking habits and place of study but even for these habits the correlations are fairly substantial. The positive correlations shown in Table 35 indicate that, in general, common methods of studying have been employed to a considerable extent at the time of initial and subsequent testing.

The results in Table 35 refute the null hypothesis that no significant relationship exists between students' initial test scores on separate study habits and subsequent scores for the same habits.

In short, over a period of one year, considerable consistency for separate study habits is maintained. This consistency applies also to combined study habits.

Discussion

The results suggest a confidence in predictions made about certain aspects of students' behaviours when the predictions are made from one year to the next. A longitudinal observation has the added advantage of conferring a reliability to the testing instrument and in this respect the results obtained here offer some originality because the comparison of initial and subsequent study habits has not been done in the previous Literature.

It might be useful, in future research, to compile local norms for the study habits inventory which would give a predictive validity for use within the polytechnic context.

5.8.13 Relationships Between Study Habits and Other Variables

Examination of Table 36 shows eight significant correlations exist between study habits and other variables, the exception being with A levels and I.Q. in degree course students.

Consequently, for all other variables with the exception of A levels and I.Q., the null hypothesis is rejected for degree course students. However, the fact that the significant correlations, in general, are low indicates only slight relationships. The same conclusion applies to the four significant correlations existing between study habits and variables identified as locus of control; motivation; academic self concept and time spent studying, for non degree course stbdents.

For the above four variables, the null hypothesis is rejected but it is accepted for the remaining six variables for non degree students.

Inspection of Table 37 shows seven significant correlations between study habits and variables identified as neuroticism; locus of control; anxiety; motivation; academic self concept; time spent studying and examination classification for male degree course students. Also, five significant correlations exist between study habits and neuroticism; anxiety; motivation; academic self concept and examination classification for female degree course students.

However, apart from the negative correlations between motivation and study habits for male degree course students and between anxiety and study habits for female degree course students, correlations are small and reflect only slight relationships between variables. For the degree course students the significant correlations lead to a rejection of the null hypothesis for these variables and an acceptance of it for relationships between variables where the correlations are not significant.

Consideration of Table 37 shows far fewer significant correlations between study habits and the variables for non degree course students. For male non degree course students the significant correlations occur between study habits and locus of control and time spent studying. For female non degree course students the significant correlations occur between study habits and motivation; academic self concept and time spent studying.

For the above variables the null hypothesis is rejected but it is accepted for stauy habits and the variables of intelligence; extraversion; neuroticism; A levels; anxiety and examination classification for both non degree course males and females. The null hypothesis is also accepted for male non degree course students for motivation and academic self concept. It is further accepted for female non degree course students for locus of control.

It is observed that the sizes of the correlation coefficients are small and so reflecting only slight relationships.

Reference to Table 38 shows that within Faculty I correlations between study habits and other variables are, in general, small. It is observed that although five significant correlations occur for the males with neuroticism; locus of control; anxiety; motivation and time spent studying, none occur for the females.

Consequently the null hypothesis is rejected for females in FacultyI but accepted for males in Faculty I where significant correlations occur.

For all Faculty I students (n=181) there are four significant correlations between study habits and other variables. These are neuroticism; locus of control; motivation and time spent studying. The null hypothesis is rejected for these variables in this group but accepted for other variables.

Inspection of Table 38 shows four significant correlations exist for males in Faculty 2 and also for females in Faculty 2 and that five significant correlations exist for all students in Faculty 2. Common to all these groups are the relationships between study habits and the variables of motivation; academic self concept and time spent studying. For Faculty 2 males a significant relationship also occurs with anxiety and for Faculty 2 females it occurs with examination classification.

The data relating to Faculty 2 students leads to a rejection of the null hypothesis where significant relationships occur and an acceptance of it for variables where no significant correlations exist. Attention is drawn to the fact that correlations are, in general, small whether or not they are significant and this leads to the overall conclusion that any relationship established is slight.

Examination of Table 38 reveals that four significant correlations and three significant correlations between study habits and variables exist for Faculty 3 males and females respectively. Four significant correlations exist for all Faculty 3 students, irrespective of sex.

Common to all groups are the significant relationships between study habits and the variables of motivation; academic self concept and examination classification. The considerably higher correlation coefficients for these variables in the case of female students may be, in part, due to the small numbers of females in Faculty 3 (n=20).

Significant correlations between study habits and intelligence occur for the males and for the total sample of students but the sizes of these correlations are small, reflecting slight relationships.

The data relating to Faculty 3 students leads to a rejection of the null hypothesis where significant correlations occur and an acceptance of it for variables where no significant correlations exist. Again, it is observed that, apart from three significant correlations for the females, correlations are small and indicate only a slight relationship between the variables and study habits.

Reference to Table 39 shows that for degree course students, there are significant relationships between the following variables :-

(a) study habit I and anxiety; motivation; academic self concept.

(b) study habit 2 and neuroticism; motivation; academic self concept.

(c) study habit 3 and intelligence; extraversion; neuroticism; anxiety; motivation; time spent studying; academic self concept.

(d) study habit 4 and neuroticism; anxiety; motivation; time spent studying; academic self concept.

(e) study habit 5 and neuroticism; anxiety; motivation; time spent studying; academic self concept.

(f) study habit 6 and all variables other than A levels; anxiety.

(g) study habit 7 and intelligence; locus of control; motivation; time spent studying; academic self concept.

For the above sub tests and variables with significant correlations the null hypothesis that no significant relationship exists between separate study habits and other variables in degree course students, is rejected. It is accepted for those variables for which correlations are not significant. It should be appreciated that even when relationships are statistically significant they are only slight since the size of the coefficients are small.

Examination of Table 40 shows that the following relationships exist in degree course students :-

(a) For male degree course students there are significant relationships between study habit I and anxiety; motivation; academic self concept.

(b) For female degree course students there are significant relationships between study habit I and all other variables.

(c) No significant relationships hold between study habit 2 and all variables in male degree course students with the exception of study habit 2 relating to motivation.

(d) No significant relationships hold between study habit 2 and other variables in female degree course students with the exception of study habit 2 relating to intelligence and motivation.

(e) No significant relationships hold between study habit 3 and other variables in male degree students except for study habit

3 and motivation and academic self concept.

(f) Significant correlations exist between study habit 3 and intelligence; neuroticism and academic self concept in females.

(g) Significant correlations exist between study habit 4 and anxiety and motivation in male degree course students.

(h) Significant correlations exist between study habit 4 and extraversion; anxiety; motivation in female degree females.

(i) Significant correlations exist between study habit 5 and neuroticism; anxiety; motivation; academic self concept in males.

(j) Significant correlations exist between study habit 5 and extraversion;anxiety; motivation; academic self concept in females.

(k) Significant correlations exist between study habit 6 and time spent studying; motivation and academic self concept in males.

(l) Significant correlations exist between study habit 6 and extraversion; motivation; time spent studying in females.

(m) Only one significant correlation exists between study habit 7 and variables in male degree course students. It is with motivation.

(n) Significant correlations exist between study habit 7 and intelligence and motivation in degree course females.

For the above sub tests and variables for which significant correlations occur, the null hypothesis that no significant mean difference exists between separate study habits and other variables for degree course students classified according to sex, is rejected. It is accepted for those sub tests and variables with non significant correlation coefficients.

Attention is drawn to the fact that, in general, even where significant correlations occur, relationships are only slight since the majority of significant correlations are small.

Inspection of Table 4I shows that in the case of non degree course students the following relationships occur :-

(a) No significant relationship between study habit I and other variables, apart from time spent studying, exists.
(b) No significant relationship between study habit 2 and other variables exists.
(c) Significant relationships between study habit 3 exist with locus of control; A levels; motivation and time spent studying and academic self concept.
(d) No significant relationships exist between study habit 4 and other variables except with academic self concept.
(e) Significant relationships exist between study habit 5 and intelligence; locus of control; motivation; time spent studying.
(f) Significant relationships exist between study habit 6 and motivation; time spent studying; academic self concept.
(g) Significant relationships exist between study habit 7 and neuroticism and locus of control.

For the above sub tests and variables for which significant correlations occur, the null hypothesis that no significant relationships exist in non degree course students, is rejected. It is accepted for those sub tests and variables with non significant correlation coefficients.

Reference to Table 42 shows that for non degree course students classified according to sex the following relationships occur:-

(a) For males, no significant relationships occur between study habit 2, 4 and 7 and other variables.

(b) For females, no significant relationships occur between study habit I, 2, 3 and other variables.

(c) For males, a significant relation occurs between study habit I and intelligence.

(d) For males, significant relationships occur between study habit 3 and time spent studying and academic self concept.

(e) For males, a significant relationship occurs between study habit 5 and time spent studying.

(f) For males, significant relationships between study habit 6 and intelligence; motivation; time spent studying occur.

(g) For females, a significant relationship between study habit 4 and academic self concept exists.

(h) For females, a significant relationship between study habit 5 and motivation exists.

(i) For females, a significant relationship between study habit 6 and motivation and time spent studying exist.

(j) For females, a significant relationship exists between study habit 7 and motivation.

For the above sub tests and variables for which significant correlations occur, the null hypothesis that no significant relationships hold between separate study habits and other variables, in non degree course students classified according to sex, is rejected. It is accepted for those sub tests and variables with non significant correlation coefficients.

Consideration of the significant correlations shown in Table 42 shows that, in general, their sizes are small and unsubstantial. This reflects the fact that the relationship between most of the variables and sub tests is slight.

An exception occurs for study habit I and intelligence which is high in comparison with the other relationships established.

Discussion

It is observed that except for degree course females and all non degree course males, intelligence and study habit I,which describes skill in examination techniques, have no significant relationship. The notion of these variables being distinct in kind has support in the Literature (Lafitte, I963; Gibbons and Savage, I965). Only in Faculty 3 did a relationship between the two variables occur for the total student group and even here caution is needed in any interpretation because of the small correlation coefficients established.

Potential for counselling and implementing remedial programmes for faculties or courses for which wastage rates through examination failure and withdrawal for reasons of academic problems occur seems helpful when the wastage appears due to factors other than inadequate ability.

The relationships existing between the separate study habits and other variables are observed to frequently occur for dispositionally related skills. All three faculties, for example, indicate a relationship between study habits and motivation in all students groups, irrespective of the classification. Academic self concept and anxiety and time spent studying are variables showing a relationship with more than one separate sub test in at least five groups of students classified in various ways.

A common factor might possibly be that personality dimensions interact with study habits making them less a feature of cognitive ability than of temperament. An observation infrequently reported in the Literature is that personality dimensions of extraversion and neuroticism seem less centrally involved in separate study habits than the dimensions of academic self concept, anxiety and motivation.

Some support exists in the Literature for the observation that study habits might be temperamentally related rather than ability dimensions (Brown, 1960; Treppa, 1973; Robyak, 1978).

5.8.I4 Separate Study Habits and Examination Performance

Inspection of Table 43 shows that the following relationships occur:-

(a) For the total student sample, slight but significant correlations exist between the separate sub tests and examination performance.

(b) For degree course students, slight but significant correlations exist between separate study habits and examination performance.

(c) For non degree course students, no significant correlations occur.

The null hypothesis that no significant relationships exist between separate study habits and examination performance, is rejected for the total student sample and for degree course students. It is accepted in the case of non degree course students.

There are significant correlations between sub tests 2, 3, 5, 6 and 7 and examination performance in male degree course students and between sub tests I, 2, 3, 4, 5 and 6 and examination performance in female degree course students.

Consequently, for the above students the null hypothesis that no significant relationships exist between the separate sub tests and examination performance, is rejected. It is accepted for those relationships which are statistically non significant.

Consideration of Table 43 shows that for the non degree course students no significant correlations occur at all. The null hypothesis is accepted within this group.

When the data in Table 43 is inspected for relationships existing in the case of male and female students, it is observed that significant correlations occur between sub tests 2, 3, 5 and 6 and examination performance for the males, and between sub tests I, 2, 3, 4, 5 and 6 and examination performance for the males.

For these sub tests in the case of male and female students, the null hypothesis that no significant relationship exists between separate study habits and examination performance is rejected. Where no significant correlations occur, the null hypothesis is accepted.

It is appreciated that in the total student sample (n=620) and the males and the females the major contribution to the significant relationships which occur is made by degree course students. It is interesting to note that even when significant relationships occur between separate sub tests and examination performance, the relationships are slight since the magnitude of the correlation coefficients is small.

(a) Faculty membership and separate study habits and examination performance

Examination of Table 44 shows that in Faculty I only one significant correlation occurs for males and females between sub tests and examination performance. It is that which occurs between sub test 6 and examination performance in the males and for sub test I in the females. In general, Faculty I students have only one significant correlation which holds between sub test 6 and examination performance. The null hypothesis that no significant relationship exists between separate study habits and examination performance is rejected for those sub tests described above but accepted for the remainder in Faculty I males and females.

Inspection of Table 44 shows that in Faculty 2 there is a fairly substantial correlation between sub test 4 and examination performance in males and smaller positive correlations between sub test 4 and 5 and examination performance in females.

The null hypothesis that no significant relationship exists between separate study habits and examination performance is rejected for these sub tests and groups of students. It is accepted for the remainder in Faculty 2 males and females as for all Faculty 2 students.

Reference to Table 44 shows the following relationships occur :-

(a) For males, slight significant correlations between sub tests I, 2, 5, 6 and 7 and examination performance.

(b) For females, substantial significant correlations between sub tests I, 2, 3, 5 and 6 and examination performance.

(c) Slight correlations between all the sub tests and examination performance in the total student sample of Faculty 2.

The null hypothesis that no significant relationships exist between separate study habits and examination performance is rejected for the above tests and groups of students. It is accepted for sub tests

3 and 4 in the males and sub tests 4 and 7 in the females.

An inspection of Table 44 shows that the least frequency of significant correlations occurs in Faculty I and the greatest frequency occurs in Faculty 3. It is noticed that in Faculty 3 the correlation coefficients are fairly substantial for both females and for students in general. Too much stress ought not be placed on this finding since the size of the female sub group in Faculty 3 is small.

Discussion

Discussion concerning these results raises the interesting point that the highest number of significant correlations occur between lecture note taking skill and examination performance. This is supportive of an emphasis in the Literature on separate study habit 3 identified as lecture note taking (Noall, I962; Elliott and Wright, I983). Published guides to effective study similarly emphasise this particular skill as important to achievement (Erasmus, I978; Cassie and Constantine, I977).

This same result may be perceived as supportive of a contemporary proposition in the Literature (Entwistle, I983) that successful students, identified as high performers in examinations, have some similarity in their patterning of study habits. In other words, they are seen to have effective lecture note taking skills in common according to one interpretation of the present Study's findings. In supporting this the results discredit a suggestion by Blake (I953) that similarity in study habits exist in groups of students described as good or bad students.

A relationship between place of study and examination performance exists for all students in Faculty I and for degree course and non degree course students in this faculty. No apparent explanation exists but a possible line of argument lies in the fact that these students receive a high amount of set homework to be completed outside of lecture hours. It was found earlier that Faculty I student groups spend more time studying than many other groups and this result is compatible with the present one.

A surprising result is the relationship established between organisation of study time and examination performance in Faculty 2 females. It might have been anticipated that a relationship between these variables, if significant, would occur in additional groups. No explanation for the relationship occurring in just this one sub group presents itself for discussion.

5.8.I5 Examination Performance And Its Relationship With Sub Groups Of Students Classified According To Sex And Type Of Course Pursued.

Reference to Table 45 shows a significant χ^2 value for the degree course students and examination performance and also for the non degree course students and examination performance. There is a significant tendency for sex to be associated with level of examination performance in these groups.

It is observed that whereas more males than females obtain fail or poor performance scores (0 and I numerical scores indicating a fail and the lowest classification equivalent to a third class honours), in both absolute and relative terms, a significantly higher proportion of males obtain the best performance scores. (The numerical scores are ranked 4, 3, 2, I, 0 to describe levels of performance equivilent to a Ist, 2i, 2ii, 3rd, fail class).

This pattern holds for both the degree course and the non degree course students and results shown in Table 45 lead to a rejection of the null hypothesis that sex, irrespective of type of course pursued, does not significantly influence the frequencies of students'achievement levels in examination performance.

The frequencies of males and females falling into the extreme categories of 0 and 4 resembles somewhat the distribution pattern of intelligence for the sexes in normal populations. For the variable of intelligence, the evidence is that the mean level of

I.Q. for the sexes is the same, with more males being at both extremes and more females concentrated in the middle,

Examination of Table 46 shows significant differences for frequency distributions in degree course students classified according to whether their study habits are scored above or below the median. No such frequency distributions for examination performance occur in non degree course students. When degree course students are classified according to sex, significant frequency distributions occur for students with scores above or below the study habits' median score.

For the non degree course students classified according to sex and study habits above or below the median, no significant associations between study habits and examination performance level occurs (Table 47).

Examination of Tables 46 and 47 leads to a rejection of the null hypothesis that no significant differences for frequencies of examination performance levels occur for males and females taking degree courses, and an acceptance of the null hypothesis for male and female non degree course students.

Discussion

In the total student sample all separate study habits were seen to have some relationship with examination performance and this occurred for the degree course students' sub group too. It is interesting to observe that although overlap occurs between male and female degree course students for three study habits,which are examination revision; lecture note taking skills; organisation of study, four study habits show a relationship with examination performance in the male and the female sub groups. Females' examination techniques and textbook reading skills relate to the level of examination performance and time when studying occurs relates to level of examination performance in males.

The least frequent relationships between combined study habits and wxamination performance level occurs in Faculty I students when compared with Faculties 2 and 3 and also in male rather than in female sub groups.

Within the degree course students, those whose study habits are above the median score show highest frequency of relationships with examination performance. Possibly these study habits comprise three skills which have an important function in examination success in that the majority of students exhibit them. These are examination revision; lecture note taking skills; textbook reading skills; organisation of study time.

5.8.I6 Intra Relationships Existing Between Separate Study Habits

Reference to Table 48 shows that the most saturated loadings for what can be conceived as a Factor I construct, occur between sub tests 4, 5, 6 and 7 which are identified as textbook reading skills; organisation of studying; time of study and place of study. The most saturated loadings for a Factor 2 construct occur between sub tests 2 and 3 which are identified as examination revision and lecture note taking skills.

Consideration of the separate study habits identified from sub tests 4, 5, 6 and 7 reveal that they may be perceived as comprised of general organisational skills. Hence Factor I can be called a general organisational factor.

Consideration of the separate study habits identified from sub tests 2 and 3 reveals that they are specifically concerned with certain organisational aspects of studying and so may be called a specific organisational factor.

Discussion

The division of loadings is an interesting one, suggesting that examination revision and lecture note taking have things in common. It might be suggested that the facility in abstracting elements of relevancy from a background of information has something to do with the underlying denominator.

The common element underlying the separate study habits of textbook reading skills; organisation of studying; time of studying and place of studying is more diffuse and less identifiable. It might be the case that these skills are most dependent on dispositional factors which would confirm the generality of this so called organisational factor. It could be investigated in future research whether these skills are more or less susceptible to coaching and practice effects than the two Factor 2 ones.

5.8.17 <u>Discussion of results for the examination of relationships existing between strategy preferred and the variables of intelligence, extraversion, neuroticism, study habits, academic self concept and A levels.</u>

With reference to Table 50 it is observed that no significant relationship exists between preferred strategy and combined study habits. There are more focusers in both groups of students described as those with good study habits and those with poorer study habits. This implies the overall finding of there being more focusers in the total sample than there are scanners.

With reference to Table 50 there is no significant relationship between preferred strategy and measured intelligence. There are more focusers in both the high level ability and the lower level ability groups. Overall there are more focusers than scanners.

Table 50 indicates that no significant relationship exists between preferred strategy and extraversion. There are more focusers in both the high extraversion and the low extraversion groups, with focusing being the generally preferred strategy.

Examination of Table 50 shows a significant relationship to exist between preferred strategy and neuroticism. This holds at the 0.05 level. Lower levels of neuroticism are associated with a stronger tendency towards focusing. It has been suggested (Bruner, 1956) that focusers like to concentrate on one thing at a time unlike scanners who like several things on the go. The statistical significance of the association between focusing and stability, seems to be supported by a psychological significance. It seems reasonable to suppose that these dimensions have some real relationship with each other.

Table 50 shows that no significant relationship exists between preferred strategy and academic self concept, but there is an indication of a trend towards focusers having more positive self images. This again gives support to the notion of there being personality correlates of thinking strategies.

Table 50 shows no significant relationship exists between preferred strategy and A levels. The failure to establish a positive relationship between either ability variable (IQ and A levels) and strategies might well suggest that the student population sample is relatively homogeneous in ability, or that ability variables are not associated with strategies to the degree that personality variables appear to be.

Implications And Suggestions For Future Research

The association between neuroticism and preferred strategy has some implications for teaching - learning interactions.

The Literature (Biggs, 1979) has suggested the relevance of knowledge about differences in learning approaches for the classroom. The argument is that of tailoring teaching in order to be compatible with students' preferred approaches, and for changing those approaches that are described as unproductive.

There is some support (Child, 198I) for the view that focusing strategies are the more appropriate for classroom learning. There is also a suggestion that sometimes this is not the case. Examples are when time constraints are imposed and when there is a limit on the number of questions students are permitted to ask.

In the I956 Study it was found by Bruner, Goodnow and Austen that subjects sometimes modify strategies to suit the task and the implication is that external factors like task difficulty and context can influence strategy choice. It was also observed in the I956 Study, however, that subjects consistently adopted similar strategies across different tasks and that different subjects adopted different strategies when given the same task.

The latter observation that some evidence exists to support the notion of strategies being predisposed by individual characteristics of the learner is supported by the present Study.

The Literature on neuroticism (Eysenck, I970) suggests that the effects of neuroticism on learning are difficult to predict. Some studies (Entwistle, I983; Brown, I970; Furneaux, I962) have established the relationship to be an inverted 'U' shape. Common sense dictates that too little anxiety, as well as too much, inhibits learning.

Two studies (Furneaux, 1962 and Kelvin, 1965) establish that neuroticism tends to be associated with superior examination performance but that the neuroticism tends to be paralleled with high introversion. Studies have independently established the superiority of introvert types over extravert in academic achievement (Gibbons and Savage, 1965; Entwistle and Welsh, 1969; Eysenck, 1970). Lavin (1965), in a review of the American Literature, concludes that the overall opinion supports an assumed superiority of extraversion, especially extraversion associated with stability. It is possible that the significant dimension is that of extraversion or introversion rather than neuroticism or stability.

One British Study (Wankowski, 1973) has found that, in general terms, high neuroticism and high extraversion together tend to inhibit academic performance and result in lower examination marks. Stability and introversion, on the other hand, tend to combine to produce a superior performance in examinations.

Studies have been carried out (Entwistle and Wilson, 1977; Gibbons and Savage, 1965) to investigate the relationship between neuroticism and other individual difference variables like study habits.

No previous studies can be found which investigate the combined effects of neuroticism and preferred strategy on learning performance. The positive, significant results found by the present Study between neuroticism and strategy type, suggest the following tentative implications for future research :

(I) A focuser will probably prefer to concentrate on one thing at a time and get it absolutely clear before moving on to new information. Partial understanding will be worked at until it becomes full and complete understanding. Qualities that characterise the neurotic type are undue worry, panic under conditions of stress and over emotional reactions (Child, I98I). It is suggested that these qualities are associated with habitual ways of responding in similar conditions. An implication of this is that neurotic types can be expected to be more emotional, more panicky and worried in problem solving situations. High neuroticism might be seen as incompatible with focusing strategies underlining lecturers preferred ways of presenting information.

(2) A focuser will predictably prefer a step by step approach in which logically presented material follows a logical progression from one point to the next. Sub headings and the use of coherent argument are liked. A practical implication of this for teaching considerations is that students who are described as neurotic types will predictably find this approach in teaching extremely boring and in that event will find it unprofitable.

(3) A scanner will probably prefer to have several ideas on the go at once and to perceive different aspects of a problem as providing 'food for thought' leading to later meaning. High neuroticism might be less incompatible with this approach.

(4) A scanner might find a teaching approach with ideas and principles emerging from the lecture material or recommended reading as opposed to expository methods of facts giving, more attractive. Neurotic types, if compatible with scanning strategies as suggested by the present Study, would find highly structured lectures unattractive and on this account, unprofitable.

In conclusion, it can be said that research results should not be expected to generalise to contexts other than those which are highly similar to that of the research study and for this reason the generality of results is limited in its implications.

The relationships observed in the present Study between neuroticism and preferred strategy in a sample population of polytechnic students might be affected by the contextual factors. However, it is a relationship that suggests a relevance for further investigative study.

5:9 Administration and Observations From The Qualitative Data

Students' Attributions Of Academic Success

> *"I am not an underachiever; My teacher is an overexpector."*
> *(Claxton, G., 1979, The Little Ed Book)*

A sample of 150 first year students, drawn from Arts (Faculty 3) and Sciences (Faculty 2) was selected. The composition of the sample is that the Faculty 2 group comprises Mathematics and Computer Sciences (n = 72) students; the Faculty 3 group comprises Humanities and Business Studies (n = 78) students.

The students are asked, during a timetabled hour for their respective courses, to respond to an open ended question of, *"What do you think is important for you to succeed academically?"*. The written responses are collated into categories emerging from the nature of responses given. These categories comprise twelve kinds of response. Students additionally volunteered verbal information which was noted in conversation after the class.

Results And Discussion

Reference to Table 52 shows that effective study habits are perceived by students to be of primary importance as a factor of academic success. It is of interest to note that students indicate that they do not always perform important habits despite being aware of them.

Table 52 Students' Attributions Of Achievement (n = I50)

Attribution category	f	rank order
Study habits	309	I
Lectures	I32	2
Lecturers	96	3
Social life	79	4
Interest	50	5
Motivation	38	6
Ability	37	7
Domestic stability	26	8
Peer group	25	9
Luck	I7	I0
Financial security	I3	II
Health	I0	I2

Table 53 Attributions Of Separate Study Habits

Reading skills	73	I
Examination technique	53	2
Time	49	3
Note taking skills	4I	4
Organisation	38	5
Revision	32	6
Place of study	23	7

This discrepancy is noted in the Literature (Maddox, 1967; Weigel and Weigel, 1967) The classification of study habits' responses into the seven categories described in Table 53 occurs spontaneously. The open ended format of the instruction given to students avoids pre conceived classes of response. It is interesting to note, that with the exception of one single response, all responses fall into the categories of study habits identified by SHEIK which is the psychometric scale used in the present Study for quantitative data on study habits in the student sample.

In the results tables the idiosyncratic response is grouped under the study habits called *organisation of work*. The response states :

"I think we should have more discussion on what lecturers expect of us like what they think we should be doing with our time and what is expected in different subjects."

The similarity of the categories used by the published scale of study habits and these observed by the present Study gives a prima facie validity to the new scale and although this does not achieve the status of a validation study, it does give a face validity which is important in psychometric measurement.

Examination of Table 53 shows that textbook reading skills are valued most highly of all the study habits. Typical responses include :

"Doing reference reading ... expanding on your lecture notes ... using good books ... being able to refer to books and abstract important bits."

Some students feel that not enough advice about reading skills is given :

"I would like to be told, 'Read this by tomorrow', or something. They (the lecturers) tell us to read up a topic but I don't know whether I should read all the book or what."

Some students perceive other areas of difficulty :

"Getting hold of books is awful. Sometimes I don't even bother to go and look in the library when I know about a hundred others are looking too."

The importance of textbook reading skills has been described in the Literature (Buzan, 1974; Noall, 1962) and the present Study offers some support to the view that students themselves perceive them as important.

Inspection of Table 53shows that examination technique is ranked second in importance as a study habit. Typical responses include :

"Having good exam technique ... learning better exam technique ... it's all down to how you do on the day (examination) which is a bad thing really ... correct choice of questions in exams."

Some students perceive examination techniques and examination performance generally as being of total importance for their academic achievement. For example :

"It's no good being nervous in exams. If you are then I don't think you can do very well." "It's decided on three hours work what you have gained over the three years of your course."

The Literature supports a notion of examination techniques being critical to examination performance and some studies (Maddox, I967; Rowntree, I976) describe their high ranking as a study habit.

Table 53 indicates that time is ranked third in importance as a study habit. This category refers both to time when studying occurs and to the number of hours spent studying. In actual fact, very few (n = 4) of the responses indicate a preference for describing an importance for the amount of time spent studying. The majority of the responses describe the effect of the time of day when studying occurs on their academic performance. The four responses concerned with the number of hours spent studying are :

"Working several hours each night, six nights a week. ie. A forty hour week." ; "Continual hard work throughout the year." ; "Personally I think that hardwork, obvious really, is essential." ; "I think you should work every night until nine o' clock or something, and then go out. That's alright but I don't do it."

The Literature lacks consensus about research attributions concerning the importance of number of hours worked (Savage, I972). One study (Williams, I935) has suggested that discrepancy between students' reported time spent studying can be explained as a function of the different ability levels of students.

Williamson (I935) observes that students who spend fewer hours in study behaviours tend to have higher measured ability than those who study for longer hours. He suggests that for students of lower ability levels, increased study time serves a compensatory function.

Some contemporary and British research (Holloway, 1966; Cooper and Foy, 1969; Gibbons and Savage, 1972) support Williamson in concluding that the number of hours spent studying is not significantly associated with academic achievement.

The majority of responses referring to time (n = 45) describe the importance of time when studying occurs and the problem of *unsociable* hours which are perceived as constituting a performance variable. Typical responses include the following :

"There's too much free time between 9 and 5 ... There's too much free time ... I feel there isn't enough to do."

Many students feel that they have enough time in which to study but that the times are not useful because of the duration being short between classes or because they are unsociable. Some students even suggest that more flexible timetabling could be done to accommodate students' bursts of activity. Examples of responses are :

"Why can't a lecture be done on video and we could see it, say before a discussion seminar later in the week. It's up to us when we see it then as long as it's before the seminar.";

"Lecturers forget that we've got other things to do. Funny really when you think they were students too once. Some nights I can't do anything because I have other things to do.";

"I work after I get back from the Union Bar. Perhaps I'll start at about eleven and work until two o'clock. I can't make nine o'clock lectures and even the ten o'clock ones sometimes see me half asleep.";

"I don't work much. Sometimes I feel guilty when I see how hard students on other courses are working and I think I should be doing more. I like to work late at night and nearer to deadlines."

The Literature offers some support for the effects of a discrepancy between time when students are required to study and times when they feel like it. Doskin and Laurentiva (1974) suggest that the time of day when students study affects the degree of retention when tested for recall. In their study of Russian undergraduates recall rate varied with whether study occurred in the morning, afternoon or evening time.

Doskin and Laurentiva conclude that arousal rates show greater excitation or inhibition for individuals at different times of the day. The results of the present Study seem to support that time when studying occurs will have an effect on performance.

Examination of Table 53 shows that note taking skills are valued after good reading skills, examination techniques and time when studying occurs. Typical responses are :

"Good lecture notes are important ... I think you should go over lecture notes at night and expand on them ... Going over lecture notes."

Some responses are related to the quality of lecture notes given by lecturers and some overlap between categories exists. When this occurs, the responses are grouped under *"lecture"* when this has the most relevance. It might account for the fourth rank order of note taking skills as a category of important study habits. Typical responses illustrating the overlap are :

"There's one lecturer who goes off like a sten gun. We only hear it once. If we had a film we could play it back and hear the bits we missed or got wrong. Some of my notes have got wrong bits and I can't sort it out."

"Sometimes a lecturer's voice puts me off. If something is boring I say it over to myself in a voice I like and I can understand it then."

The Literature suggests the importance of note taking skills (Arnold, I942; Clemems and Oelke, I967; Erasmus, I978) and many books on self help with study habits (Rowntree, I976; Cassie and Constantine, I977) describe their important role in academic success. The students' attributions in the present Study are supportive of the research results.

Further examination of Table 53 shows that organisation of work is ranked fifth. Responses include :

"I worked best when I did three A levels in one year. I don't work here, there's no pressure to and so I don't. I can't do anything until I get a deadline and then I panic and work hard for a couple of days until it's done."

"I know I'm lazy and I wish someone would give me a kick and say, 'Get on with it instead of messing around'."

Students seem generally to experience problems in organising study schedules. Many speak of the advantages conferred by course essay timetables and deadlines for handing in assignments. The absence of this tends towards a backlog of work to be done by the end of term.

Further inspection of Table 53 shows that examination revision is ranked sixth. This is perhaps a surprising rank order when it is observed that examination techniques are ranked first. Not one student comments on the usefulness of revision techniques like working from past papers. One speculation is that students are unaware of the need for access to and the use of past papers for revision, and of the status of revision itself.

The Literature (Cassie and Constantine, I977) describes revision through the use of past papers as critical to success. The discrepancy between research attributions and students' attributions is disturbing. There may be potential for counselling and guidance here.

A typical response to illustrate those which fall into the category of examination revision is hard to find but one is as follows :

"Having good exam technique and revising well for the exams."

Table 53 indicates that place of study ranks last in order of perceived importance. Students tend to qualify their answers in this category and examples are as follows :

"A quiet place to work in is important ... A warm place that's well ventilated ... A good place to work in with a big table and no noise ... The library is useless."

Some students comment on the location of their place of study. In preferring accommodation close to The Polytechnic these students are indirectly referring to the need for study time but the categorisation is distinct enough to allow categorisation under this heading. Examples :

"Having accommodation near the Poly. and not having to lose time and money getting back and fore. ... To live near the Poly and and not have all the stress of getting buses and missing them. ... The hostels should be on the same site (as the Polytechnic) because of the time you waste travelling."

The overall ranking of study habits above other variables like ability or motivation and interest supports some of the previous Literature. As early as the 1900's, the *British Journal of Educational Psychology* published a research Paper on study habits as a variable of academic achievement (May, 1923). Contemporary opinion (Cooper and Foy, 1969; Entwistle et al, 1974; Wankowski, 1976) confirms this status for study habits and a recent publication of effective study (Cassie and Constantine, 1977) offer advice on note taking skills, textbook reading; revision and examination techniques.

Reference to Table 52 shows that ranked next to study habits is lecture content and lecturer effectiveness. The majority of students discriminate between good lectures and good lecturers. Lecturers tend to be evaluated in terms of their success in establishing rapport, their personality and approachability. Lectures are judged on the basis of content level, structure and pace of presentation. Examples of responses relating to the quality of lectures are :

"Good lecture notes ... Coherent and concise lectures ... Good lectures that have humour and lots of examples ... Lectures that I can follow and that aren't too fast ... Structured notes ... Lectures with examples that are varied and that don't leave hard examples for homework ... Lectures with aids and examples."

Some students undervalue the importance of lecture notes as a factor contributing to their academic achievement although they are few.

Examples of this are hard to find but one is as follows :

"I find lectures boring. I don't think having lectures is important. I look forward to seminars. I wish it was all seminars."

Attributions of achievement relating to the personal qualities of lecturers include the following examples :

"Feeling that lecturers treat you as a person and not just a number on the Course matters ... I like lecturers who know our names. There's one lecturer who doesn't know who we are and he mixes me up with someone else ... I like lecturers who say, 'Hello', when we meet ... I think we should meet socially and chat over coffee. I'd say things then but I won't in a seminar. There's lots like me ... I think lecturers are important. Some of our group have got great lecturers but others we've got don't even look at us when he's talking ... Lecturers should know us and be able to say, 'Oh, so and so isn't in today because of this or that' ... I think they should know all about us ... There's one lecturer we've got who talks at us as if he wants us to know how little we know and what a lot he does."

Many responses are related to staff student relationships and without exception these indicate a felt need for frequent and personal encounters. Students tend to perceive staff as important indicators of their academic progress and also as supports for emotional and personal development.

The need to be recognised by name seems to be widespread. This is supportive of findings reported in the Literature. Meighan (I98I) has suggested how communication between lecturers and their students produces inferences about competence which can be explicit. Cohen (I972) has described how academic confidence is affected by exposure to successful models. Wankowski (I973) refers to this as leading to an *intellectual impotence* when the discrepancy between successful model and self concept is too great. Miller and Parlett (1974) also offer support for the effect of lecturer and student inter personal relationships leading to feelings of esteem or otherwise in students.

Table 52 shows that a social life is valued highly by students who rank it fourth in order of importance for academic success. Typical responses include :

"You need to relax socially to refresh mind and body ... Let your hair down occassionally ... Balancing work and play ... Ability to mix socially ... Play sport ... Need to have friends to go out with and cheer you up."

One student says that it is important to :

"Combine work with other activities to enable me to live a full life and to make me a complete person."

Students attribute a good social life to be more important to them than interest in their chosen course and the motivation to work hard at it. These two variables, interest and motivation, rank fifth and sixth respectively. Typical responses are :

"I can't read something that doesn't interest me ... Interest ... I think it's up to you. I don't expect anyone to tell me to work hard, we're not babies, it's up to us isn't it?"

"You need incentives to work ... I can't work if I'm hungry ... You need pressures like goals and incentives."

The Literature supports the proposition that motivation tends to be over emphasised by lecturers in its importance for academic progress. Svensson (I977) describes how many lecturers believe motivation to be the single most important factor in academic performance. He believes that the concept of motivation needs closer analysis and differentiation in terms of type.

Intrinsic motivation is different in kind to extrinsic and the two are said to result in different qualities of learning outcomes. Intrinsic motivation is most closely related to interest in a course for its own sake whereas extrinsic motivation relies on the use of rewards and punishments.

Wankowski (I973) describes how a linear relationship between motivation and achievement measured as examination performance can be descriptive of extrinsic motivation only. Other studies have supported this (Biggs, I97I; Entiwistle et al, I974). Bruner (I968), Fransson (I977) and Beard and Senior (I980) have independently emphasised the need to discriminate between the two types of motivation and to recognise that extrinsic rewards and punishments vary in their motivational strength.

Entwistle et al (I974) suggest that hope for success and fear of failure are motivational factors more characteristic of students in Higher Education and that these types of achievement motivation lead to ways of studying that are different from those of intrinsically motivated students. The student sample in the present Study describe both kinds of motivation as being of importance but in both cases their rank order is low.

Table 52 indicates that ability is perceived to be similar in importance to both interest and motivation. Ability, however, is perceived as less important and ranked seventh. It is interesting to note that students believe their ability is less important to them than the quality of the teaching they receive. Responses include :

"You need a good brain ... Being above average intelligence ... Having the ability to do it."

A distinction occurs between ability measured as intelligence quotient and ability defined in terms of performance at A level. Students typically say things like :

"For this degree anyway I think you've got to have maths (at A level) ... Having appropriate A levels ... They (the lecturers) assume we've all done things at A level and I haven't ... I think lecturers shouldn't assume so much from A levels. Some of us haven't done any."

The students who make these comments are enrolled on courses which do not stipulate an entry requirement of specific A level subjects. Selection is based on performance at A level but the subjects examined in are irrelevant. Student perception is contrary to the view that specific skills and knowledge are not pre requisite.

The Literature supports, to some degree, the observation that a distinction needs to be made between ability defined as IQ and ability defined as A level performance (Lavin, 1965; Gibbons and Savage, 1965) Some studies have suggested a need to de emphasise the assumed importance of straight A level grades because they appear to be rather poor predictors of academic success (Eysenck, 1947; Gibbons and Savage, 1965; Beard and Senior, 1980).

It is possibly the case that ability factors have a threshold effect in that a certain minimum level of intelligence is required in Higher Education but over and above this level, higher levels are less important. The present Study supports the suggestion from the Literature that ability factors need reconsideration in an attempt to lessen the discrepancy between research and student attributions.

It is of special interest to note that students make particular reference to the relevance of their A level subjects, as opposed to A level grades, for their chosen courses. Past and relevant experience are attributed to be more important than A level points.

Table 52 shows that domestic security ranks eigth. Students comment :

"It's important to have an understanding family ... parents to encourage you."

Table 52 further indicates that relationships with peer groups rank ninth, typical responses in this category being as follows :

"You've got to have friends to talk to ... We all helped each other at my other place (FE College). It's really competitive here and noone will help you or even tell you what they're doing."

"I thought I was stupid when I first came here and I hated it. I found I wasn't really any more stupid than the others after a bit only I was more honest and said when I couldn't understand the stats."

We feel there's pressure for us to be competitive. We never show our work. I asked someone the other day if they understood this theory and they said, 'Yes', but I knew they didn't."

Table 52 shows that luck, financial security and health are ranked tenth, eleventh and twelth respectively. Under the health category, the highest frequency of response is that of adequate sleep, followed by good attendance contingent on good health. Some students see luck as being mainly responsible for their success or failure but the majority see elements of luck entering their academic lives. For example :

"Being lucky and getting the right exam questions ... You've got to be lucky and get the right books or have a micro that's not malfunctioning."

It is of special interest to note that domestic security is a more common response in the mature student group, as is financial security. Other students refer to the need for adequate grants but the mature student group qualify their responses with an expressed need for finance to support dependents. The Literature offers some support for this observation.

Implications and suggestions for further research

These qualitative results offer some support to the findings of previous studies in the Literature, all of which are quantitative in design and which use psychometric techniques of measurement. (Weiner and Klein, 1976; Kelly and Michela; Marsh, 1984).

This corroborative role seems useful in lending a face validation to the rigor of standardised testing in the empirical studies. Students in the present Study did, in the main, report attributions of academic achievement established by research findings.

The results of the Study specifically support the observations of Little (1985) that ability factors are attributed to be less important than other factors by students who are past the primary school stage. Little comments on the complexity of attribution processes in young students at primary level and writes (Little, 1985, p. II) that :

"The attribution process is a complex interaction of objective and subjective reality."

He presents a brief review of the Literature investigating students' attributions of academic success and failure at primary school (Weiner and Klein, 1976; Weiner et al, 1980; Kelly and Michela, 1982; Fincham, 1982).

The Literature referred to uses a taxonomical model (Weiner, 1979) of attribution which presents attributions as a matrix of ability, effort, task difficulty and luck, organised along a dimension of locus of control and stability.

Of these studies, some claim the centrality of effort and ability attributions (Heider, 1958; Weiner, 1979) whilst others believe that luck is most important (Frieze et al, 1976).

Little (1985) suggests that variability in research opinion exists because a developmental trend in attributions occurs with attributions of ability decreasing with age. This proposition would be an interesting focus for future research investigation.

The low ranking of ability variables in seventh place and the low ranking of motivation in fifth place, implies that students see other things as more critical to their academic success or failure. When questioned about this some students volunteer the information that first year students are generally less concerned with judging the interest level of their courses than with passing the examinations and proceeding to the second year. This observation might tentatively be suggested as an explanation for the high ranking of good lecture notes and lecturer attributions by students whose aim is to get through the examinations.

The implication is that the rank order of attributions might be peculiar to first year students and further research could establish whether alternative rank orders exist for second and third year students.

The high ranking of study habits supports a research premise of many investigative studies (Biggs, 1978; Entwistle et al, 1974; Miller and Parlett, 1974) that behavioural variables are as important in academic achievement as the cognitive and dispositional ones. In other words, the study of what students do is as central to their progress as their intellectual capacity.

It is interesting to note that the results broadly confirm the categorisation of study skills identified by the SHEIK which is comparatively new as a research tool and which has no British validation studies. Although students' responses in the present Study fall into the same categories of habits identified by the SHEIK the validation status is not that of a validation study. However the results might be seen as serving a legitimising function of conferring a face validity in the eyes of a student sample which is important in psychometric research.

There are implications for further investigation and for educational practice developing from this present Study, additional to those already described.

One implication is concerned with the observation that many students, whilst having attributions of the importance of effective study habits for academic achievement, report that they do not make use of this knowledge.

The prescription for practice is that counselling potential in the use of effective habits is not high but that course board planning for remedial instruction in the use of study habits is high. Students do not need information about study habits, they need practice in their use.

A second prescriptive function of the findings is the suggestion that a potential exists for feedback from students' attributions of achievement to lecturers, whose behaviours could be modified in the light of this information. It is of interest to note that students distinguish between good lectures and good lecturers and that they report a felt need to have frequent interaction with academic staff as much as (and sometimes more often) than they report a felt need for complete lecture notes.

There is support in the Literature for this finding (Marsh, I984). Marsh investigates something called *lecturer expressiveness* in his study of the experimental manipulation of motivation on students' examination performance.

He suggests that lecturer expressiveness has a substantial impact on motivation to learn and on performance in examinations. He refers to this influence of lecturers as a *Dr. Fox effect,* presumably because of the enticing role that lecturers are seen to fulfill in comanding students' interest and commitment. He writes (Marsh, I984, p. 206) :

"Enthusiastic lecturers can entice favourable evaluations even when lecture content is devoid of meaningful content."

In his Study, Marsh (I984) refers to the *Dr. Fox paradigm* described by Ware and Williams (I975); Williams and Ware (I976), and Marsh and Ware (I982). These studies, using factorial design, examine expressiveness of lecturers and level of lecture content coverage in a systematically varied way. Students view videotaped lectures from which to make their evaluations.

Reviews of the Dr. Fox results (Abrami et al, I982; Ware and Williams, 1979, 1980) have consistently concluded that differences in lecturers' expressiveness explain more variance in students' ratings than differences in content coverage.

It would be a useful focus for future research to examine lecturers' attributions of student achievement to establish whether any similarity in perceptions occurs.

A further implication of the findings in general is that a need arises to examine whether any discrepancy in students' attributions of achievement exists across the faculties of an institution. This contextually related focus would have counselling potential within polytechnics and universities and it would highlight the need to consider, if variability exists, the importance of faculty membership as a variable of learning performance and learning outcome.

5.10 CONCLUSIONS

"I'm afraid you've got a bad egg, Mr. Jones."

"Oh no, my Lord, I assure you. Parts of it are excellent."

(Punch, vol. cix. p. 222, 1895)

The main conclusions of this Study, with their consequences for practical application and for further research, have been discussed in the main text. Retrospectively, these conclusions can be identified as forming an eight point plan for evaluative comment.

Firstly, a conclusion of relevance to practice is that students whose study habits scores are above the mean tend towards higher levels of examination performance. This indicates a potential for counselling and remedial intervention with those students diagnosed as having poor study habits. It is observed that a discrepancy occurs between students' reported knowledge of effective study habits and their use of them. This implies that intervention programmes ought to be concerned with practice and not instruction in study habits.

A second conclusion of the Study which relates to this first one is that faculty membership seems to be related to study habits in that students pursuing courses within the Faculty of Professional Studies appear to have superior study habits. The reasons for this are not clear but it might be supposed that differences in the effectiveness of study habits occur before students enter Higher Education as first years. If faculty membership is a self selected phenomenon, poor study habits might be perceived as characteristics of certain faculties. This would indicate a potential for remedial intervention directed towards particular faculties.

A third conclusion concerns the stability of study habits. There is evidence of consistency between study habits measured before and after the duration of one year which suggests that study habits are relatively stable and enduring. There is no longitudinal data on study habits in the Literature and this stability is of interest to note.

A fourth conclusion is that separate study habits tend to share some common features identified as a common loading. This is described as a general organisational factor and it pervades habits of examination revision, textbook reading, organisation of time, place of study, and general cognitive functioning which pervades examination techniques and note taking skills. The former common feature is suggested to be descriptive of typical aspects of study behaviours which are not cognitively related. It is possible that potential for counselling might be stronger in these non cognitive study behaviours. A suggestion for future research is to conduct an item analysis of inventories used in the investigation of study habits and achievement in previous studies to identify which studies use measurement scales defining study habits as cognitive rather than as organisational skills. Discrepancies might account for the lack of consensus in the Literature concerning the association of study habits, variously defined, with achievement.

A fifth conclusion, relating to the findings concerned with students' study habits, is that certain relationships exist between study habits and individual difference characteristics of ability and personality.

It seems to be the case that personality dimensions are more important correlates of study habits than are ability variables. An identikit of the academically successful student emerges with distinctive features of superior study habits and particular personality traits. An implication of this finding is that study habits can been seen as serving a compensatory function in moderate to low ability students and that, as habitually used skills, study habits can be manipulated and modified to bring about improved performances.

A sixth conclusion is that consensus exists between students' attributions of success and the research evidence. Students recognise the high ranking of study habits as factors of academic achievement even if they do not always put their beliefs into practice.

Similarly, consensus exists between students' self reported identification of separate study habits and those identified in the SHEIK. This reflects on the face validity of the psychometric instrument used by the Study to measure study habits. It is of interest to note that effective study habits are attributed to be less important than the quality of lectures and the approachability of lecturers, but more important than ability level of students.

Further investigation of attributions of academic achievement in lecturers would have potential for comparative research and for pragmatic consequences in feeding back to lecturers involved in teaching-learning encounters.

A seventh conclusion of the Study to be highlighted in this summative comment is that students' learning strategies, measured on concept identification tasks, are identifiably distinct. This supports a research opinion that strategies, as an aspect of cognitive styles, are an individual difference variable. However, it is acknowledged that the concept identification task itself influences the processes of thinking by which solution is achieved and that the artificiality of the context might exert an influence on the strategies emerging.

Further research could examine these qualifications more explicitly by using less artificial concepts and using different kinds of concepts.

The presence of different strategies generated by the same task is taken to be evidence of preferred strategies by individuals. However, future observation of the absence of different strategies in one individual across different tasks could be seen as more conclusive evidence for the existence of a predisposition in learning approach.

It would be of interest to note whether, in the event of an individual demonstrating an availability of more than one type of strategy, it could still by hypothesised that a predisposition exists. This would then be accounted for in terms of variability in approach accommodating a notion of predisposition for a preferred strategy but with available alternatives to be selected when appropriate.

The implication is that strategies are seen as having a relevance for task and contextual demands and that their adoption by students describes a *strategist.* Strategists are those students who are able to perceive task requirements and who are flexible enough to adapt their learning approach to meet these requirements. The proposition would accommodate, for example, Bruner's (1956) observation that a focuser will sometimes use a scanning strategy when pressed for time or when new information is limited. These constraints of the learning situation require strategic action which some students are able to exhibit.

An eighth conclusion of the Study relates to the results found for learning strategies and their associated correlates defined as dimensions of personality. Of these dimensions it is observed that neuroticism shows a significant relationship with learning strategies. Some of the implications for practice are discussed in the results section of the Study but a consequence of the finding for future research is that further investigation of the relationship between strategies and dispositional variables seems useful. This original observation needs replication studies and it would be of interest to investigate whether any developmental trend in the relationship of neuroticism and learning strategies occurs.

A final conclusion reached by the present Study is that any research enterprise tends to have something in common with the parson's egg referred to in the opening quotation of this chapter. In the expectation that certain parts are bad and in the hope that other parts are not, the Study stands. The aims of the Study, expressed in general terms, to examine more than one type of variable when describing students' learning behaviours leads to the summative conclusion that a need exists to recognise the *whole concomitant influence* of variables.

APPENDIX A : Statistical Procedures Employed.

"It is one thing to show a man that he is in an error, and another to put him in possession of truth".

(John Locke, I632-I704)

APPENDIX A DETAILS OF STATISTICAL PROCEDURES EMPLOYED

I. In order to ascertain the significance of mean differences between various groups of students, the "t" test was employed after the means and standard deviations for different variables had been calculated.

The formulae used for (a) independent means, and, (b) correlated means, are given below :

(a) Independent means "t" = $$\frac{\bar{X}_I - \bar{X}_2}{\sqrt{\frac{S_I^2}{N_I} + \frac{S_2^2}{N_2}}}$$

Where $\bar{X}_I$ = mean of first group; $\bar{X}_2$ = mean of second group;

S_I = variance of first group; S_2 = variance of second group;

N_I =number in the first group; N_2 = number in second group.

(b) Correlated means "t" = $$\frac{\bar{X}_I - \bar{X}_2}{\sqrt{\frac{S_I^2}{N_I} = \frac{S_2^2}{N_2} - 2r\left(\frac{S_I}{\sqrt{N_I}}\right)\left(\frac{S_2}{\sqrt{N_2}}\right)}}$$

Where $\bar{X}_I$ = mean of first group; $\bar{X}_2$ = mean of second group;

S_I^2 = variance of first group; S_2^2 = variance of second group;

r = correlation coefficient.

(2) The Pearson Bravais Correlation Coefficient, r, was used to ascertain the relationships between scores on different variables.

The formula is given below :

$$r_{xy} = \sum \frac{XY}{NS_xS_y}$$

Where, r_{xy} = correlation coefficient between X and Y;

XY = sum of cross products of deviation scores for X and Y;

S_I and S_2 = standard deviations of X and Y scores;

N = the number of pairs.

(3) The X^2 test was employed to test the differences in frequencies of responses falling into the various categories between samples.

The formula used is given below :

$$\chi^2 = \frac{(\text{observed frequency - expected frequency})^2}{\text{expected frequency}}$$

Where, $\sum$ = sum of.

(4) The scores of I50 students, on the various sub tests of study habits were subjected to a varimax rotational analysis, the purpose of which was to determine whether common factors exist for the various sub tests. The Burts-Banks formula was used to determine the significance levels for loadings on extracted factors.

The correlational matrix of study habits sub test scores was subjected to a principal components abalysis. Two factors were extracted using Kaiser's criterion. A varimax rotational analysis was then applied to the factor matrix, yielding the varimax factor matrix.

APPENDIX B : Organisation Of The Three Faculties,
and, Courses Within The Polytechnic.

The Three Faculties

FACULTY OF ENVIRONMENTAL STUDIES (FACULTY I) Department of Civil Engineering and Building Department of Estate Management and Quantity Surveying Department of Mining and Mine Surveying Department of Science
FACULTY OF ENGINEERING STUDIES (FACULTY 2) Department of Chemical Engineering Department of Electrical and Electronic Engineering Department of Mathematics and Computer Sciences Department of Mechanical and Production Engineering
FACULTY OF PROFESSIONAL STUDIES (FACULTY 3) Department of Business Studies and Public Administration Department of Behavioural and Communication Studies Department of Arts and Languages Department of Management and Legal Studies

Courses

Faculties	Degree Courses	Student Numbers
One	B.Sc. Urban Estate Management	n = 45
	B.Sc. Civil Engineering	n = 43
	B.Sc. Quantity Surveying	n = I9
	B.Sc. Combined Sciences	n = I6
Two	B.Sc. Electrical & Electronic Engineering	n = 30
	B.Sc. Mathematics & Computer Sciences	n = 28
	B.Sc. Computer Sciences	n = 52
Three	B.A. Business Studies	n = 74
	B.A. Humanities	n = 7I
	B.A. Communication Studies	n = I6
	B.Sc. Behavioural Sciences	n = 23
		4I7

Faculties	Non Degree Courses	Student Numbers
One	HND Building	n = I3
	HND Civil Engineering	n = 2I
	HND Mining	n = I2
Two	HND Electrical Engineering	n = 38
	HND Mathematics & Computer Studies	n = 33
Three	BEC Business Studies	n = 68
	Diploma in Vocational Guidance	n = I8
		203

Total n = 620

APPENDIX C : Letters of Correspondence

"It's always best on these occasions to do what the mob do." "But suppose there are two mobs?", suggested Mr. Snodgrass. "Shout with the largest," replied Mr. Pickwick.

(Charles Dickens, Pickwick Papers, ch. I3)

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Ms. Eira Williams,
Dept. of Beh. and comm. Studies,
The Poly of Wales,
Llantwit Road,
Prefforest,
Pontypridd,
Mid Glamorgan

Our Ref: CD/jda/ 15th July 1981

Dear Ms. Williams,

STUDY HABITS EVALUATION AND INSTRUCTION KIT

Thank you for enquiring about this instrument.

This was developed by Peter F. Jackson, Neil A. Reid and A. Cedric Croft of the Test Development Division of the New Zealand Council of Educational Research:

New Zealand Council of Educational Research,
Education House,
178 Willis Street,
WELLINGTON 1,
New Zealand

Please let me know if you need any further information.

Yours sincerely,

Clive Downs
Senior Psychologist

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Communication Studies,
PONTYPRIDD,
Mid Glamorgan CF37 1DL

Our Ref RT/AS Your Ref Date 24th May, 1982

Dear Eira,

Teaching of Study Skills Project

Many thanks for your letter. Your work sounds very interesting - especially since I have not previously heard an independent opinion on S.H.E.I.K. - and I would welcome the opportunity to exchange information.

As I explained at BPS, our final report is due to be published by NFER-Nelson at the end of this year. The paper I gave at York was in the form of a report on progress since I am unable to present the detailed conclusions until the book has been produced. I can discuss the findings informally, however, and would willingly answer any queries about the project. For now, I enclose our project newsletters - albeit written to keep our teacher audience up to date - and hope that these will help you both to understand the scope of our work and also to frame any particular questions you may have.

Yours sincerely,

Ralph Tabberer

Ralph Tabberer,
Project Leader,
Teaching of Study Skills Project

Encs.

THE UNIVERSITY OF NEWCASTLE UPON TYNE
SCHOOL OF EDUCATION

PROFESSORS OF EDUCATION:
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27th May 1981

Ms. E. Williams,
Department of Behavioural and
Communication Studies,
The Polytechnic of Wales,
Pontypridd,
Mid Glamorgan.
CF37 1DL

Dear Ms. Williams,

Thank you for your letter. You are quite right in suggesting that I have an interest in learning and study methods although in the last few years I have not had much opportunity to get myself up to date with the literature having held an administrative post here at Newcastle. However, I have one or two students whom you may like to contact and perhaps you would mention my name in any correspondence with them.

Sandra Manook is a lecturer at Newcastle upon Tyne Polytechnic, Coach Lane Campus, Coach Lane, Newcastle upon Tyne, 7. She has been doing a most interesting doctorate in the field of note-taking and you may find correspondence with her of some interest.

I have also a Ph.D. student, Mr. Mike J. O'Neil, who is preparing to conduct research involving the Biggs process-product model. He can be located at the following address:
Teesside Polytechnic, Department of Educational Studies,
Flatts Lane Centre, Normanby, Middlesbrough, Cleveland. TS6 0QS

I hope these two will be helpful to you.

Yours sincerely,

Dennis Child

Dennis Child

dc/ht

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Eira Williams,
The Polytechnic of Wales,
Department of Behavioural and Communication
Studies,
Pontypridd,
Mid-Glamorgan

3 June 1982

Dear Eira Williams,

Thankyou for your letter in which you show an interest in my research. I have enclosed a copy of the paper which I read at the conference; and I hope that you find it of some interest.

I shall look forward to any feedback, comments or questions you might have on any aspect of the paper. I should be interested, also, to learn of your own work.

Yours sincerely,

Stephen Cherry.

UNIVERSITY OF EDINBURGH
Department of Education
10, BUCCLEUCH PLACE, EDINBURGH, EH8 9JT
031-667 1011

Professor N.J. Entwistle, B.Sc., Ph.D.

15th May, 1985

NJE/JM

Ms E. Williams,
Department of Behavioural Studies,
The Polytechnic of Wales,
Pontypridd,
Mid Glamorgan.

Dear Ms Williams,

Thank you for your kind comments on "Styles of Learning and Teaching". In fact, that book was published in 1981 and I have subsequently published a book with Dr. Paul Ramsden called "Understanding Student Learning" (Croom Helm, 1983). This book reported the full results of our SSRC research programme at Lancaster. I have also been involved in editing a research symposium on research on student learning entitled "The Experience of Learning" (Scottish Academic Press, 1984).

You might also be interested in the most recent work of John Biggs from Newcastle in Australia, who, in a paper to be published in the British Journal of Educational Psychology next year, has discussed the way in which locus of control interacts with approaches to learning. It might be worthwhile writing to Professor Biggs to get a copy of this paper. He is at the Department of Education, University of Newcastle, NSW 2308.

I should be very interested in having details of your research findings if they are in a form which you could send me.

With best wishes,

Yours sincerely,

Noel Entwistle

Professor N.J. Entwistle

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"Your manuscript is both original and good; unfortunately, the parts which are original are not good, and the parts which are good are not original."

(attributed to Ben. Johnson)

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